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ABSTRACT

This guide is designed to assist in the preparation of "hands-on" career experiences in the health care occupations for high school students. The experiences take place in at least three different work settings in addition to participation in small-group discussions, and lectures from practicing professionals. Students are encouraged, in the final stages of the practicum, to explore one specific health care occupation in depth. The guide is divided into three sections: (1) introduction; (2) steps for practicum implementation; and (3) developing the practicum curriculum. Ten appendices provide supporting instruction on details such as form preparations and press releases. (RE)

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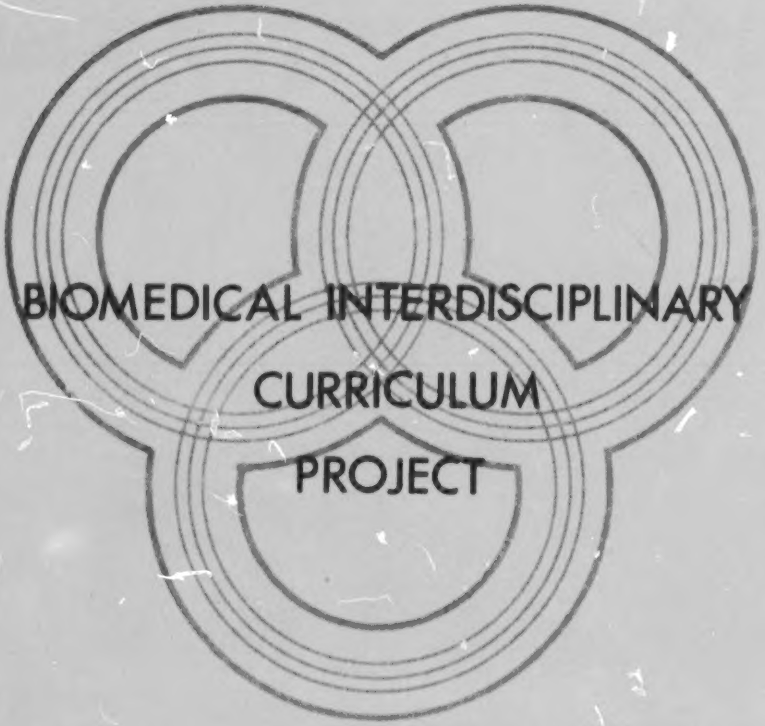

BIOMEDICAL INTERDISCIPLINARY
CURRICULUM
PROJECT

PRACTICUM MANUAL

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PRACTICUM
MANUAL

THE BIOMEDICAL INTERDISCIPLINARY CURRICULUM PROJECT

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SECTION 1

THE BIOMEDICAL PRACTICUM: AN INTRODUCTION

Career decision-making is a vital concern of all students. The Biomedical Practicum was designed to prepare students for making career decisions by providing a practical "hands-on" introduction to a variety of health careers in health care settings.

I-1 PURPOSES OF THE PRACTICUM

The goal of the Practicum is to enable high school students to "try out" several health careers of greatest interest to them. The objectives are: (a) to assist students in learning what is meant by the term "medical team"; (b) to bridge the gap between the classroom and the world of work; (c) to foster self-sufficiency and independence in the Biomedical students; and (d) to help the students develop job-seeking skills.

I-2 BACKGROUND

The Biomedical Practicum is, in part, an outgrowth of a career-education movement which is rapidly expanding throughout the United States. The primary goal of career education is to inform students about careers so that they will make better choices, to the benefit of themselves and others. Although many career-education programs have objectives similar to those of the BICP, the Biomedical Practicum is different in that it enables students to apply skills they have learned in the classroom to problems as they arise in real work situations.

A commonly accepted definition of career education was developed by the Committee for Career Education of Chief State School Officers:

> Career education is essentially an *instructional* strategy, aimed at improving educational outcomes by relating teaching and learning activities to the concept of career development. Career Education extends the academic world to the world of work. In scope, Career Education encompasses educational experiences beginning with early childhood and continuing throughout the individual's productive life. A complete program of Career Education includes *awareness of self* and the *world of work, broad orientation to occupations* (professional and non-professional), in depth *exploration* of selected *clusters*, career preparation, an *understanding of the economic system* of which jobs are a part, and placement for all students.

The BICP Practicum encompasses this definition. It is an instructional strategy in which teaching and learning activities are closely tied with the concept of career development. It provides a blending of the academic world and the work setting by enabling students to apply what they have learned in the classroom to the actual career situation. It also gives students work experiences which they can relate to their classwork during the following school year. Practicum students have an opportunity to learn more about their interest in and aptitude for health careers by reviewing career clusters, participating in small discussion groups, listening to practitioners talk about their work and experiencing at least three different work situations. Toward the end of the Practicum, students explore one career of their choice in more depth. Through the Biomedical Social Science course and the Practicum, the students receive a good orientation to the economics of the health-care delivery system. The Practicum does not provide job training placement. However, the Biomedical Curriculum and the Practicum do prepare students for and guide students toward career preparation in post-secondary institutions and equip them with certain job-seeking skills.

I-3 DESCRIPTION OF THE PRACTICUM

A student's perspective of the Practicum is illustrated by the following scenario of a typical Biomedical student.

* * *

Linda heard about the Practicum for the first time in March of her junior year. She learned that the summer Practicum offered students the opportunity to work in hospitals and other health care settings. They would receive credit for summer school, but would not be paid. Each student would be able to "try out" at least three health careers during the eight-week summer school.

The third week in June, she attended the first meeting for all Practicum students. Most of the discussion that morning focused on what to expect during the summer program. A pretest was given which queried the students on what they expected from the Practicum and how they felt about the health-care practitioners with whom they would be working. The students were then briefed on the many forms they would be required to fill out. The students were informed about the requirement of keeping a journal on their experiences each day of the Practicum.

The next four days of orientation covered different topics such as medical ethics and an introduction to twelve health-career clusters encompassing over three hundred health careers. The contents and use of a career library were reviewed. The students were taught how to write resumes and participate in interviews.

Linda was given several curriculum modules. Each module described one health career, including educational requirements and personal qualifications, and a list of possible activities a student could perform when placed with someone in that career. In the module on Medical Laboratory Careers, for example, Linda discovered that she could apply some of the laboratory techniques she had already learned in Biomedical Science to actual tests on patients. The module also described selected problems that she could try to solve in the medical laboratory.

As part of the orientation, a dental hygienist came to the classroom and demonstrated some equipment and techniques students would need in dental placements. She also explained what the supervisors expected from the students and what the students could expect from them in return. Linda reveived answers to her questions about dress, schedules and what the people would like. On another day, a paramedic taught the class how to measure vital signs and respond in a health emergency. He also stressed the importance of students' being self-disciplined and volunteering to do work they weren't assigned.

* * *

By Monday, the first placement day, Linda felt well prepared. She was placed in nursing, her first choice. During the bus ride to the hospital she reviewed the curriculum module on nursing so that she would be prepared for the meeting with her supervisor, Mrs. Lenox. Linda checked to make sure she had everything she needed: lab coat, module, her notebook, and a name tag identifying her as a Biomedical student.

Mrs. Lenox seemed delighted to meet Linda. She introduced her to the other staff working that shift. Then, after a tour of the hospital, they sat down for a short conference to plan their week together. Mrs. Lenox explained that she world treat Linda like the other workers on the ward and that, in return, she expected Linda to act like an employee, arriving each morning on time.

Linda replied that during this first week she was most interested in meeting patients. She pointed out several activities in the curriculum module that interested her. After they reviewed the module and marked the activities Linda wanted to do that week, Mrs. Lenox drew up a schedule for her.

That afternoon, Linda copied the schedule into her journal and wrote an appraisal of her morning experience:

Mrs. Lenox seems really nice. She is a lot older than I expected. She says she'll retire in a few years and that she has been head nurse on this ward for ten years. She was very helpful in introducing me around and helping me get to know the hospital.

The first day I read over all the patients' charts and then met the patients. This is a geriatric ward so there are a variety of illnesses. One of the women is a diabetic who refuses to take her insulin. She was in a coma when one of her neighbors found her. Tomorrow I will go to diabetic class with her and try to help her understand diabetes and the importance of insulin and a particular diet. I will help her plan out a day's diet so that she can learn how to select her foods. Tonight I'm going to review what I've studied on diabetes and check in the library for more information. I figure I've got to understand it pretty well if I'm going to be any help to this woman.

Today I watched the nurses start an intravenous feeding. It made me sick to my stomach to watch the needle enter the man's vein. He was so old and thin and was in a coma. It was awful. The one nurse said I would get used to it and that everyone gets queasy the first time. I learned that the intravenous solution he was getting was made up of saline, glucose, and gelatin (for protein). People can live on *intravenous solutions for months, but their digestive systems get lazy from the lack of exercise and this can create problems when the person returns to a normal diet.*

I had lunch in the staff lunchroom with Carol, the ward clerk. She showed me how the system works there. I had a pretty good lunch and it didn't cost very much.

On Tuesday Linda's experience with the diabetic class went well. The nurse teaching the class gave the patients a good explanation of diabetes and answered their questions. The class then did a meal-planning exercise. Linda did so well in teaching her patient that the instructor asked her to help a few more people. The patients seemed to like Linda.

During the remainder of the week, Linda learned a lot about nursing. Some nurses stressed efficiency so much they almost seemed to overlook the patients, while others made the patients their number one priority. She found a sharp distinction between RNs and LVNs. RNs had a lot more responsibility. LVNs were somewhere between RNs and orderlies. They received less pay and couldn't qualify for head-nurse positions. Some RNs had graduated from two-year schools, while others had attended four-year schools from which they received a BS degree as well as their nursing diploma. Although it seemed confusing at first, Linda felt she had learned a great deal at the end of her week in nursing.

* * *

Linda's placement for the next week was in a medical laboratory. She had never seen so many machines in her life. During her first day she observed the technologists and on the second day she was permitted to rerun some patient samples and compare her results with those of the technologists. She tested her own blood and urine samples as well. She discovered that her carbohydrate level was a bit high, but otherwise the results were normal. She also learned about a few new careers that week: serologist, pathologist, bacteriologist, cytologist and lab technician.

By the end of the second week Linda had become comfortable with the logistics of the Practicum. Once or twice a week, a teacher stopped by her work site to see how things were going. On Tuesdays and Thursdays, the small group of students who worked in the hospital spent a half hour or more in the staff lounge discussing what they were doing and learning. Some students were in very unusual and interesting placements. For example, one girl was in leprosy research and another was learning about ultrasound. Another student reported on her experiences in the eye clinic.

From time to time, practitioners attended the group discussion sessions. After hearing one woman physician describe the years of formal education she had completed, Linda knew she would not like to spend more than four years in college. For one thing, the money just wasn't available. Besides, she wanted to go to work as soon as she could and practice what she had learned.

* * *

At the eye clinic, her next placement, Linda realized that you had to be agressive if you wanted to explore everything. Her supervisor, an administrative assistant, was so busy that Linda was almost entirely on her own. She learned to approach staff members for permission to observe them at work. A little later, she was able to ask what she could do to help so she could get some first-hand experience. By the end of the week Linda had been introduced to such careers as ophthalmic pathologist, receptionist, administrative assistant, research assistant, billing clerk and appointments clerk. Since there was so much to explore, Linda stayed at the eye clinic in the afternoons. Eye care was extremely interesting to her. She had done quite a bit of extra reading and had studied a number of slides of eye diseases which had been taken by the ophthalmic photographer. Because of her interest, she asked that her schedule be changed so that she could be placed with an optician.

During the fourth week of the Practicum, a large meeting of all students was held in place of one of the weekly group discussion sessions. Each of the twelve health-career clusters was represented by a teacher or a practitioner. A discussion group was formed around each cluster, and each group discussed briefly the opportunities within that career cluster. Linda attended the group on Nursing Services, which concentrated on specializations within nursing, including nurse practitioner, surgical nurse, school nurse and midwife. Linda asked the nurse practitioner acting as discussion leader, "How do you get to be a nurse practitioner, and what do you do?" She discovered that this career appealed to her.

A teacher came to each group and talked about students' career planning parameters, including years of college the student wanted to attend, the cost for the necessary education, the probability of a student's being accepted in a desired training program and consideration of parental wishes. The students found it difficult to concentrate on these points; it was so hard to think now about how many years they would want to spend in college. But the teacher reminded them that each module contained information about the preparation and personal requirements for each career. For each placement, students were to compare all the requirements for the career with their own aspirations and abilities. The comparison would help them decide whether that career was within the range of possibilities for them. In addition to asking practitioners and teachers for information, students were advised to consult the career library.

That week Linda compared her abilities with the requirements for entering nursing and found the outlook favorable. Next she would to the same for careers in eye care.

The placement with the optician was a real challenge for Linda. The optician taught Linda the mathematics involved in his work and let her try grinding a lens. She was free to explore wherever she wanted, since her supervisor was impressed with what she knew and with her ability to apply the mathematical formulas involved.

At the end of that week, Linda felt she had a good knowledge of careers in eye care. The field was interesting and appealing to her. She wondered whether she shouldn't reconsider her desire to become a nurse. It appeared that there was a lot more she should know before making a decision.

* * *

In the career-investigation phase of the Practicum, Linda spent two more weeks in nursing, one in a cardiac care unit and the other in a free clinic. Her last and most exciting experience was the dental placement. Linda worked in a dental school. She accompanied a dental student to regular classes, assisted him in the clinic, observed the dissection of a cadaver in the anatomy laboratory, and learned how to drill teeth and use certain dental tools. She worked with hygienists in a preventive dentistry clinic for two days. It was good exposure to many facets of dentistry and related careers.

Linda was proud of her journal. She had kept it up-to-date, and now it really looked like a book. Her teachers had checked it several times and told her it was interesting and informative. She felt good about that because it had been a lot of work. Whenever possible she included pictures, menus and other appropriate materials with her written descriptions.

And now it was all coming to an end. The last week included post-test and an interview with two teachers, in which Linda talked about what she had learned during the summer, what she had liked and not liked about her placements and where she stood in her career planning. Where was she? She decided it would take a while to sort that out, because besides nursing she was now interested in being an optician, a dental hygienist or an ophthalmic assistant. Her second year of Biomed and some sessions with her counselor might help her choose from among her options. In addition, several practitioners had invited Linda to come back after the Practicum and work with them for the rest of the summer. She was seriously considering some of these opportunities.

In the interview, the teachers also asked her to describe the most important thing she had learned during the Practicum. Linda reflected and said, "Well, I think I learned a lot about myself. I learned I can act like a regular staff member in a job placement. I don't need a tardy bell to get me where I'm going on time. I was my own boss and I loved it! Learning was a sharing experience; people were nice enough to let me share their work with them this summer and I think we all got something out of it. I had a say in what was happening. And people treated me like an adult. I've noticed a change in the other students, too. They like having responsibility. And I think we showed we can handle it."

SECTION II

STEPS FOR PRACTICUM IMPLEMENTATION

While the introduction described the Practicum from a student's perspective, this section describes it from the viewpoint of those who will initiate, organize and supervise it. The timetable on the next page shows what needs to be done and when, and can serve as a checklist for those in charge of Practicum implementation. The following numbered paragraphs (corresponding to the items on the timetable) provide detailed suggestions for carrying out each of the steps in implementation. All staff members should read this section. One staff member, probably the Practicum Coordinator, should assign responsibility for each item on the timetable and monitor progress on all items.

The timetable is flexible, and it may be adjusted to fit a particular school's needs and resources. Some preparations should be started in January, but others do not require action until the Practicum begins. Note, however, that unnecessary problems tend to arise when decisions are postponed and when procedures that have been adopted are not followed.

II-1 DESIGNATION OF PRACTICUM COORDINATOR

The Practicum Coordinator supervises Practicum staff, recruits practitioners, establishes a Community Advisory Board, supervises development of the Practicum curriculum, directs inservice training of Practicum staff, and assists in monitoring students during the Practicum. Ideally, this person will have managerial experience, a background in individualized instruction, a good understanding of career education and a thorough knowledge of the Biomedical Curriculum.

If the Practicum is to begin in June, key tasks must be started as early as January and be continued throughout the program. In using the checklist, the Coordinator should assign a deadline for each activity and monitor the activity to completion. This job may constitute a half-time load for one semester. During the Practicum, the Coordinator's job of administering the Practicum, monitoring students, meeting weekly with teachers and visiting practitioners requires a full time commitment.

II-2 STAFF SELECTION, ORIENTATION AND TASKS

The Practicum Coordinator is primarily responsible for staff selection and training. An attempt should be made to obtain Practicum teachers from the staff who teach the Biomedical Program during the regular school year. In the Practicum, teachers become managers and problem solvers while health practitioners assume the traditional teaching tasks. Important personal characteristics for teachers include flexibility, ability to assimilate new information quickly, willingness to trade learning from books for learning from activities, ability to relate to students and meet them on their level, emotional stability, and managerial skills necessary to juggle many forms, curriculum pieces, students and practitioners. Teachers are constantly on the move, visiting each student twice a week, talking with each practitioner twice a week, collecting forms and attending regular teachers' meetings. A combination of science and social science teachers proves helpful. The science teachers are effective in helping with science content and laboratory skills, while the social science teachers usually relate to the human-relations component of career education.

An orientation program must be developed and conducted for the entire Practicum staff. It should include: (a) the purposes and structure of the Practicum; (b) individualizing instructions; (c) the use of Practicum records and (d) the development of curriculum modules; (e) practitioner recruitment techniques; (f) student and practitioner monitoring techniques; (g) the role of the Practicum Coordinator, student and practitioner, and (h) problem-solving techniques. Teachers should also be made to realize that an authority role is not appropriate for the Practicum, since the practitioners are volunteers not supervised by teachers.

Paraprofessionals. If they are utilized in the district, paraprofessionals are a useful addition to the Practicum staff. Experience in such things as drug-abuse counseling, pregnancy counseling, military service paramedics, premedical programs and community parks and recreation programs are good prerequisites. Such individuals provide a real breadth of experience to the Practicum staff. In addition to helping with scheduling and paperwork, paraprofessionals have also proved capable of monitoring students, preparing curriculum modules, and recruiting and monitoring practitioners.

Paraprofessionals should receive the same orientation as the rest of the staff.

Background Information. A book that should be extremely helpful in staff orientation is **Career Education: A Proposal for Reform** by Sidney P. Marland, Jr., United States Commissioner of Education from 1970 to 1972. Marland clearly outlines the reasons for and the benefits of career education and gives examples of its implementation in various cities across the United States.

Instructional Strategies. The instructional strategies adopted for the Practicum are an important aspect of staff selection and orientation. Since the Practicum is focused on practical experience and since each student's program is unique, the principal instructional strategies used are individualized instruction and independent study. Practicum staff members know what assignments the students are working on and what objectives the students are to achieve; therefore, the primary tasks of the teacher or paraprofessional are to facilitate learning, help solve problems students may encounter, and evaluate the students' progress. Instead of working primarily with written source materials, the students use actual health-care practitioners as their primary source of information. While "hands-on" experience is stressed for the students, "hands-off" is the watchword for teachers. The Practicum requires an inquiry approach in which students are presented with an array of tools, books, people and problems. In the first Practicum, teachers who were directive--telling students what to do and what to study--often turned students off. The setting, the stimulation of the world of work, the practitioners and the Practicum curriculum modules proved to be sufficient sources of direction and motivation. Teachers who "stood in the wings" were much more successful than those who could not relinquish their position at center stage.

Paraprofessionals can assume most of the responsibilities of regular teachers. In the first Practicum, paraprofessionals handled most clerical tasks, monitored students in placements, recruited and counseled practitioners, prepared modules and reviewed students' journals. The paraprofessionals brought an excellent variety of backgrounds to the project including medical corps experience, premedical study, family counseling and medical school, all of which supplemented the teachers' backgrounds.

Flexibility in planning among teachers, paraprofessionals and students must be stressed. Throughout the Practicum, some kind of change must be made almost every day. Changes might be required by such things as a student's extended absence due to a family emergency, a practitioner becoming ill, a new and exciting placement becoming available, last-minute cancellation of a meeting room and missing forms. One has to expect such things to happen and be ready to make quick decisions about them. Such decisions should be relayed to the staff at the weekly staff meetings.

Staff Assignments. The Practicum has worked well with one staff member assigned to each large health-care facility in which students are placed. If the number of students placed in one facility is very large, two staff members might be assigned there; similarly, one staff member might cover two smaller facilities. The students that staff members monitor move weekly from placement to placement, from one health-care setting to another. When one staff member stays in the same hospital or clinic for the entire Practicum, he or she comes to know the facility's staff fairly well and becomes proficient at placing students and communicating with practitioners.

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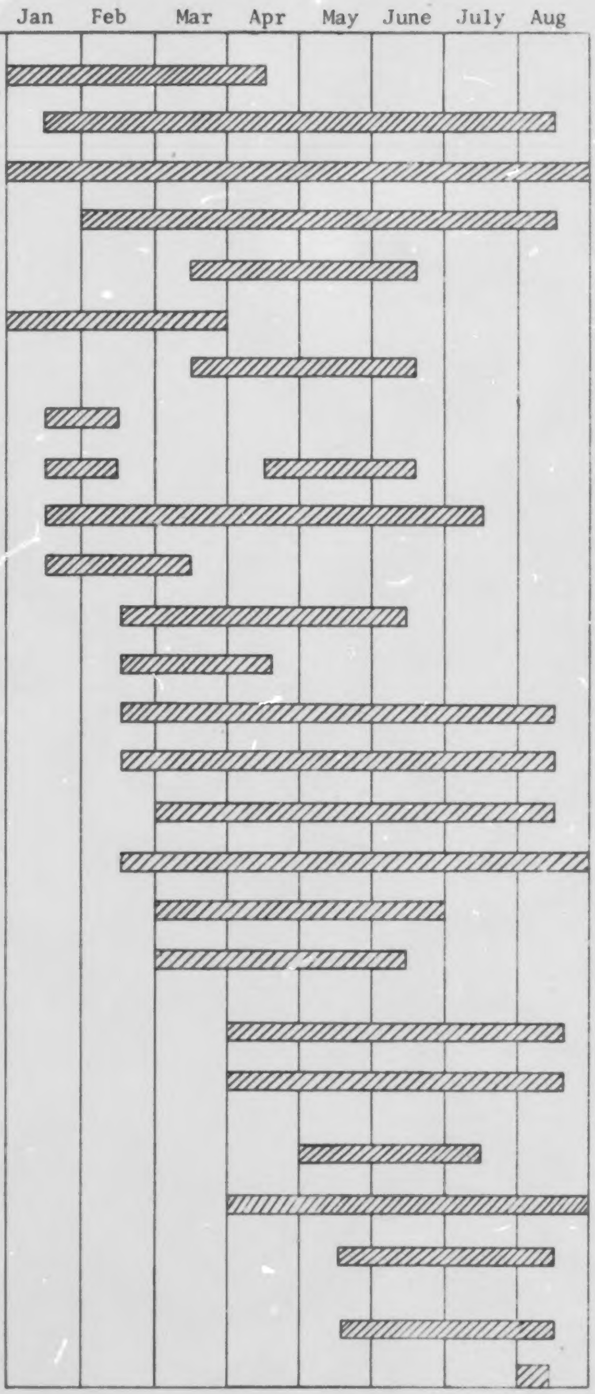
BIOMEDICAL PRACTICUM IMPLEMENTATION TIMETABLE

1. Designation of Practicum Coordinator. .
2. Staff selection, orientation and tasks.
3. School administrator's role and tasks .
4. Community Advisory Board. . . . .
5. Publicity . . . .
6. Funding . . . .
7. Student selection . . . .
8. Length of the Practicum . . . .
9. Facilities needed . . . .
10. Curriculum development. . . . .
11. Determine Practicum format. . . . . . .
12. Practitioner recruitment/orientation. .
13. Insurance . . . .
14. Career library. . . . .
15. Materials, supplies and equipment . . .
16. Teacher message center. . . . .
17. Evaluation of the Practicum . . . . . .
18. Develop and print forms . . . .
19. Design student orientation. . . . . . . and secure materials
20. Student journals. . . . .
21. Design and implement student-monitoring techniques
22. Assignment of students to placements. .
23. Credits and grades. . . . .
24. Design and implement small discussion . groups
25. Design, implement large group meetings.
26. Closure . . . .



Staff Meetings. The Practicum staff should meet once a week perhaps in the middle of the week, to compare notes, discuss possible changes and plan for the coming week. The coordinator should always conduct these meetings.

II-3 SCHOOL ADMINISTRATOR'S ROLE AND TASKS

The school administrator is the link between the Practicum and the school district. The amount of time and energy the administrator can devote to the Practicum is often limited. Involvement along the following lines is highly recommended.

In terms of Practicum design, the administrator should react to plans presented by the coordinator and staff. The school administrator is often the key person to make contacts with individuals and groups, to help establish a Community Advisory Board and to locate volunteer practitioners. A survey letter to important members of the community, telephone calls to hospital and clinic administrators, press releases, and presentations to community groups are effective means of obtaining community representation.

An administrator familiar with operating experimental or innovative programs is able to place trust in the staff and student. Tardiness, for example, is seldom a concern in the Practicum. Since scheduling will be different from that of the regular school session, administrators knowing the liabilities involved must be able to accept the necessary differences.

Arrangments must be made for use of one or more classrooms during the Students' Practicum Orientation (first week). Small meeting rooms may be needed. A telephone is a must for Practicum staff since students and practitioners are frequently called. The phone should be available as soon as the recruitment of practitioners begins.

Budgetary problems may be averted by careful planning. The school administrator should determine how much of the Practicum can be financed under the summer session budget and whether special funds must be secured. A crucial and sometimes underrated part of the budget is clerical support. With the amount of paperwork needed for such an individualized program, typists and duplicating machines are in great demand. The first year of the Practicum will be more costly than subsequent years because a student-teacher ratio of 15-1 is recommended until teachers become skilled at Practicum tasks.

Other responsibilities of the school administrator include credit, grades, insurance, TB tests for students and school policies.

II-4 COMMUNITY ADVISORY BOARD

The formation of a community advisory board for the Biomedical Project should serve three purposes: a) to provide the Biomedical Project school, students and teachers with a continuing relationship with others in the community whose knowledge, skills, and facilities can directly supplement Biomedical classroom activities; b) to assist the community health-related agencies by identifying services of benefit to the community which could be performed on a voluntary basis by students; c) to provide long range benefits to the community by assuming a role in identifying and furthering the development of health manpower resources to meet local needs.

Responsibility for establishing an advisory committee should fall on a member of the school's administrative staff or someone officially designated by the school administration. This could be either a member of the counseling staff or one of the biomedical teachers. Certainly all members of the teaching team should be involved in the plans for the advisory committee, and the counseling staff and administrative staff should be kept fully informed.

Following an initial planning meeting on the part of appropriate school staff, invitations to a planning meeting, together with materials describing the Biomedical Program, should be sent to prospective members. Responses should be requested far enough in advance to allow additional invitations if necessary to guarantee adequate attendance. Follow-up phone calls confirming the time and place of the meeting will help to assure participation. It may be helpful to make clear to those invited that attendance at the planning meeting does not necessarily imply commitment to long-term participation and that the meeting will be kept as brief as possible.

The composite membership of the advisory committee should bring together representatives of the major health institutions in the community, including innovators both in the field of health and education. Such persons should demonstrate an interest in health education and a realistic understanding of high school students. Persons holding the following positions could be considered:

a. county public health educator

b. instructor or department administrator from a science discipline or health occupations program of a local community college

c. representative from the county medical association women's auxilliary

d. school district office representative

e. school administrative representative

f. student representative

g. representative from a health care facility

II-5 PUBLICITY

To gain community acceptance of the Practicum and, especially, to recruit practitioners to work with students, a well-timed publicity campaign is very effective. Information about the Practicum--the persons involved, the goals, the students and what is needed from the community--can be made available to local newspapers and radio stations. An informational news release might ask interested practitioners to call the teacher message center and leave their name, occupation and phone number. Another technique in seeking volunteers and gaining support is to present half-hour programs at health-care agencies. Many student placements have been secured by this approach. (See sample press release, appendix I)

II-6 FUNDING

The Practicum budget will vary from school to school depending on the student/teacher ratio, the cost of producing materials, and travel requirements. Theoretically, it is possible to conduct a Practicum for the regular summer-school program at no additional cost beyond that of materials and staff transportation. Costs could be minimized by assigning teachers the standard student load, by recycling student materials and by using large health-care facilities, thus minimizing travel from one placement to another. The first year, however, will require additional funds. Possible funding sources include Neighborhood Youth Corps (NYC), the Regional Occupation Program (ROP), grants from local health care groups or associations and, if ethnic minorities are predominantly represented among students, federal minority programs.

II-7 STUDENT SELECTION

All students who meet the following criteria should be accepted: (a) evidence of negative results on a recent TB test, (b) availability for the entire Practicum, (c) access to transportation to placements and (d) parental approval. Grade-point averages were found to have little predictive value for student success in the Practicum since some students referred to as "problem students" during the regular school year do very well in Practicum programs. By its very nature, the Biomedical Practicum appears to help students who are not agressive and self-directed, and it provides enough freedom for those who are highly motivated to pursue their interests. It is interesting to note that non-Biomedical students who take the Practicum also do well in their placements. Including such students in the Practicum helps to make discussion groups and other student activities more interesting because of the variety of backgrounds represented.

II-8 LENGTH OF THE PRACTICUM

Two versions of Practicum length have been tried. Five weeks was found to be too short; eight weeks proved quite satisfactory. It is recommended that one week be spent in student orientation and five to seven weeks reserved for placements. At least five weeks in placements appear necessary to orient students to a cross section of health careers and to enable them to develop a basic understanding of health careers. The afternoons of the last week can be used for closure, including post-testing, interviews, special counseling sessions for some students, journal review and possibly a culminating social event.

II-9 FACILITIES NEEDED

Several kinds of facilities are needed for the Practicum:

a. One or more regular school classrooms are needed for the one-week orientation.

b. A centrally located room is needed for the career library, materials storage and teacher meeting area. A room in a local hospital or a school classroom would fill this need.

c. A meeting area for the biweekly small-group discussions must be available in each large health-care facility.

d. A large meeting room is needed in which all students may gather several times during the Practicum. A hospital auditorium or community recreation center would serve this purpose.

School facilities may not be appropriate, since the Practicum schedule does not conform to regular school periods, and students in regular summer school classes may be disturbed by the irregular traffic of Practicum students.

II-10 CURRICULUM DEVELOPMENT

The curriculum for the Biomedical Practicum consists of a set of curriculum modules, which are guides to exploring particular health careers. Each module contains career information as well as activities students can perform when exploring that career. The modules that have been developed to date appear in Appendix A of this handbook. It is recommended that as many additional modules as possible be developed. Although a general module is available (Appendix A), student experiences in a placement are much more meaningful when a sparate module is available for each career.

Detailed guidelines for module development are contained in Section III. Using these guidelines, the following persons were able to develop good modules during the field test of the Practicum: the coordinator, who had extensive experience in curriculum development, teaching and career education; a staff member of the Biomedical Curriculum Project who had a B.S. in science and two years of experience as a curriculum writer; and a paraprofessional who was a premed student, who had no teaching or curriculum experience but had worked in hospitals. Theoretically, anyone who has the imagination to see potential student activities in a health-care setting and who can write clearly should be able to develop a module by following the guidelines.

II-11 PRACTICUM FORMAT

The Practicum format should be determined as early as possible in order to proceed with recruitment of practitioners and to inform the Community Advisory Board, prospective students and other interested persons in the community.

The things that need to be decided upon include the length of the Practicum, the objectives students should be expected to achieve, the daily student schedule, the purpose and frequency of meetings (both among students and between students and staff members), the amount of time to be devoted to career-exploration and career-investigation placements, and closure of the Practicum.

The Practicum should be six to eight weeks long, including one week for orientation and five to seven weeks for placements. Students should spend four hours a day in placements, preferably in the morning to correspond with the daytime hospital shift. An 8 - 12 a.m. schedule has proved most effective. It allows students to use afternoons for small-group discussions and research. Note, however, that student scheduling must be somewhat flexible because some practitioners may request that students work different hours (e.g., 7-11, afternoons or evenings).

Objectives which are to be achieved by students should be outlined and given to practitioners, students and staff. Because evaluation of student performance in an individualized program is based on the achivement of objectives, they must be clear, realistic and within the students' abilities.

Two types of meetings with students are recommended. Twice weekly, perhaps on Tuesday and Thursday noons, a Practicum staff member should hold a small discussion group in each health-care facility for the students working in that facility. (See Section 24 for additional information about the purpose of these groups.) In addition, two or more afternoon meetings of all students should be scheduled during the Practicum for career counseling, discussion and a second sign-up for career placements. (See Section 25 for additional information.)

Career-education activities during the Practicum fall into three phases: (a) career information retrieval (during orientation), (b) career exploration in which three or four careers are tried out for one week each and (c) career investigation (a two-week placement in the career the student is most interested).

Closure activities should include posttesting, interviews of students, review of journals, letters of appreciation to practitioners, assignment of grades and a final social activity. Closure may take place on afternoonds during the last week of the Practicum, while the students are still in their morning placements.

II-12 PRACTITIONER RECRUITMENT AND ORIENTATION

The volunteer health-care practitioner is the key to the Practicum; the variety, quality and number of practitioners available for students to work with determine the success or failure of student activities. It requires time, energy and an accomplished public-relations approach to recruit an effective group of practitioners. In the Practicum, the practitioners are the teachers who work with students in a one-to-one relationship. The relationship must be rewarding to both practitioners and students. Recruitment and orientation of practitioners should begin at least three months in advance and end when there are one and one-half times as many practitioners as students and when practitioners represent a variety of health-career clusters and levels of responsibility.

Practitioners do not "teach" in the traditional didactic manner. They share regular tasks with students, explain what they are doing as they work, and allow students to perform health-care procedures as often as possible. Students may be viewed as interns or assistants. Practitioners should treat students like real employees who maintain a regular schedule, take coffee and lunch breaks with the staff, and have the same privileges and constraints as paid employees. Practitioners do not grade students, but they are asked to complete a brief evaluation form each week (See Appendix B). When a problem arises, practitioners should be able to reach a teacher quickly through the teacher message center. All of these points should be made clear to any practitioner who works with students. Ideally, a brief practitioner-orientation session will be held at each facility so practitioners can fully understand their role in the Practicum program.

Guidelines for practitioner recruitment should be developed and shared by all those doing recruiting, including school administrators, Community Advisory Board members, the coordinator and teachers, paraprofessionals, interested practitioners and students. These guidelines may include the following procedures:

a. When seeking an appointment with a prospective practitioner for the first time, it is wise to telephone individuals to whom you have been referred and to visit in person any other prospective practitioners. A fifteen-minute appointment is usually adequate to recruit someone.

b. Begin the discussion by explaining the purpose and objective of the Practicum. Describe the type of students involved and the Biomedical Curriculum they are studying. Stress that the Practicum is career-education, not a vocational (training) program. Describe what is wanted from the individual student and what a volunteer practitioner should provide.

c. The following points should be covered during the ensuing discussion:

- In regard to careers, students should learn the necessary education and licensing, job outlook, typical tasks, amount of responsibility, working conditions, typical salary and benefits, and chances for advancement and in-service training.
- Students should sample the work; hands-on experience is emphasized.
- De-emphasize busywork such as typing and filing; students won't benefit from this unless it actually is a large part of the job.
- The program is a motivator for students, encouraging them to prepare for their adult lives.
- The students' teachers act as coordinators and problem-solvers. They check with students and practitioners at least once a week. When a problem arises, practitioners call the teacher message center.
- Show the practitioner a sample curriculum module. Explain that the activities are suggestions and that the practitioner and student will decide together, at their first meeting, which activities the student will pursue.
- There will be times when the practitioner will find it necessary to leave the student on his own for an hour or two. A filler activity should be planned at the first meeting with the student and the student should go to that activity if the occasion arises.
- Practitioners should understand the purpose and contents of students' journals. Some students might wish to share journals with practitioners while others will want to keep them private.
- The most effective practitioners are ones who treat the students like adults--the way practitioners treat other staff members. The students in the first Practicum stated that this kind of treatment helped them to act like adults.

It would be helpful to give practitioners written information about their roles and tasks. The form given in Appendix J is useful for maintaining current information about all practitioners.

II-13 INSURANCE

In order to hold the first Practicum, two kinds of insurance had to be provided by the school district. A workmen's compensation policy covered any damages by students to practitioners. Second, accident insurance of at least $5,000 per student was provided. This coverage extended the duration of the Practicum and covered students while traveling to and from, as well as working in their placements. Any person transporting a student must have a copy of his or her personal vechicle insurance on file in the Practicum office. State codes should be checked before deciding upon insurance coverage.

II-14 CAREER LIBRARY

To support the career aspects of the Practicum, we found it very useful for students to have access to a career library. The career library consists of materials in which students can find information about the kind of work done in health-science occupations and about career possibilities in those occupations. The best way to go about gathering such materials is to write directly to national professional associations and other organizations and request such materials, which are usually free.

Note: A career library, or the nucleus of one, may already have been established by the instructors teaching the Biomedical Curriculum. Consult these instructors first as a means of avoiding duplication of effort.

Associations and organizations are listed by occupation in the Department of Labor's **Health Careers Guidebook.** (See Appendix of teacher's manual, Biomedical Soc. Sci. Unit I). Additional information is avaialbe in the **Health Careers Publications Guide** and in **Where To Get Health Career Information,** both published by the National Health Council, Inc., 1740 Broadway, New York 10019. (See Appendix C, Health Career Information Bibliography)

When you write to a particular organization, it is important to be specific about the kinds of materials you need. You might request the following kinds of information.

a. Pamphlets and brochures describing the occupation: skills required, tasks performed, techniques used and equipment operated; twenty copies of each document would be useful.

b. Listings of filmstrips, films, tapes, etc., illustrating the on-the-job experience of persons employed in the occupation. You might also ask the organization for their evaluation of the items listed.

c. Copies of or references to articles or studies describing the supply, demand and distribution of manpower in the occupation, together with information on salaries.

d. Information about location, type, cost and availability of education and training for entrance and advancement in the occupation, together with information about sources of financial aid.

e. Information that might help the Practicum staff in designing a sequence of activities for the student who explores the occupation in an actual work setting.

f. Names of persons in your own area who are knowledgeable about career opportunities and trends in the occupation and could be contacted for additional information.

Health Career Clusters: The following arrangement of health occupations by clusters is an efficient way to organize the career library. However, this should not be considered a fixed arrangement. No systematic grouping of health occupations exists throughout the professional health community. Several occupations are appropriate to one or more clusters and should be so identified. One possibility is to develop a notebook for each cluster, inserting a manila envelope (three-hole punched and flap cut off) for each career. The envelopes are then filled with all relevant materials. Students have found this arrangement to be convenient.

a. Basic Sciences and Engineering

b. Community Health Services
    - Mental Health Services
    - Social Services
    - Health Education and Communication Services
    - Environmental Health Services

c. Dental Services
d. Diagnostic and Laboratory Services
e. Dietetic and Nutritional Services
f. Health Institutional and Health Services Management
g. Medical Appliance Technology
h. Medical Services
i. Nursing Services
j. Pharmaceutical Services
k. Rehabilitation and Therapeutic Services
l. Vision, Speech and Hearing Services

II-15 MATERIALS, SUPPLIES, AND EQUIPMENT

The coordinator should arrange for the following materials, supplies and equipment to be available to the Practicum staff.

a. Basic office supplies: staplers and staples, paper clips, rubber bands, pens and pencils, correction tape or fluid, scratch paper, tape, letterhead stationery, regular typing paper, typewriter ribbons.

b. Blackboard and chalk.

c. One typewriter with interchangeable elements.

d. One or more dictionaries.

e. Large calendar on which meetings, appointments, etc., may be recorded.

f. Convenient access to a duplicating machine.

g. Large writing and collating space.

h. Storage shelves for lab. coats, curriculum modules, forms, etc.

i. Name tags for students which have an identifying logo, name of school and student title (perhaps student intern).

II-16 TEACHER MESSAGE CENTER

A teacher message center is essential. Before the Practicum begins, the phone is used to contact prospective practitioners, set up meetings and contact participating staff and agencies. Potential practitioners who respond to publicity releases can contact the Practicum staff at this number. During the Practicum, staff will receive messages from students, parents, practitioners and other staff members. Two approaches that have worked out are: (a) installing a phone in the Practicum office (a vacant classroom) and (b) arranging for the school district switchboard operator to take incoming calls and relay messages to staff and students. It is important that the phone is answered at all times during regular working hours.

MOUNT DIABLO
unified school district
student:
____
Biomedical Interdisciplinary Project

II-17 EVALUATION OF THE PRACTICUM

In order to determine whether the Practicum is effective or requires revision, an evaluation process is recommended. Several evaluation forms are included in Appendix B: student pre- and posttest, teacher pre- and posttest, and practitioner pre- and posttest; a weekly student evaluation sheet to be completed by practitioners each week of the Practicum; and a student interview form which is administered the last week of the Practicum. Pretests should be administered during orientation and posttests during the final week.

a. Pre/post questionnaire for students. This form is designed to measure student gains on such variables as career knowledge, career choice, confidence in career choice and perception of practitioners and patients. Pretest rankings and posttest rankings are tallied separately and means computed for each item. The pre/post means are then compared and the difference computed.

b. Pre/post questionnaire for teachers. Any teacher gains in understanding of the goals and logistics of the Practicum, estimation of student maturity and responsibility, and attitude toward the Practicum are measured using this form. The results are analyzed as described for the student questionnaire.

c. Pre/post questionnaire for practitioners. This form is designed to measure gains in practitioners' assessment of student responsibility, value of the Practicum to students and problems encountered in working with students. The data are analyzed as described for the student questionnaire.

d. Pre/post questionnaire for parents. You may wish to design a form to assess parents' attitudes toward the Practicum, and perceived changes in their children as a result of the Practicum experience. Such a questionnare could be administered by mail.

e. Student evaluation by supervisor. Because one form is returned each week for each student, teachers can flag students whose ratings indicate problems. At the end of the Practicum, a tally of the evaluations can be used to help evaluate each student's overall performance in these areas: knowledge about medicine/health, career knowledge, student responsibility and attitude, knowledge of laboratory procedures, familiarity with health terminology and ability to follow directions. This questionnaire is administered by sending a blank copy with each student every Monday, asking the supervisor to complete it the following Friday, and arranging for a teacher or paraprofessional to collect the completed forms during their weekly visit to the practitioner.

f. Post-Practicum student interview form. This form consists of a set of questions to be asked of each student in a private interview during the last week of the Practicum. By gathering students' personal evaluations of the Practicum, staff will gain information about problems, characteristics of good placements, career planning and changes students have seen in themselves. This information has been found indispendable in revising the Practicum. Some of the questions could be asked on a pre/posttest basis.

II-18 DEVELOP AND PRINT FORMS

A large number of forms are essential to a successful Practicum.

a. Student resume form. Each student will complete a resume form during Orientation, requiring two copies, one for a rough draft and one for a final copy. Each student will need an additional copy of the form for each week of the Practicum, since the student will need to give one copy to each new practitioner. Finally, one copy should be placed in each student's file. Therefore, the number of copies required for each student is two more than the number of weeks in the Practicum. (See student resume form in Appendix D.)

b. Student evaluation form. This form contained in Appendix B, is completed weekly for each student by the student's practitioner. Each student needs one copy for each week of the Practicum.

c. Health Career Clusters. One copy of this list of health careers, organized by clusers, will be needed by each student and staff member. The list orients students to the variety and number of health careers and students can use it to select careers to explore within three clusters (a requirement of the Practicum). (See Appendix H.)

d. List of available placements. A list of the available placements, preferably organized by career clusters, will be a great help to both students and teachers.

e. Chart of student assignments. Student placements are recorded on a master chart. Copies must be given to each staff member.

f. Curriculum Modules. Each student needs one curriculum module each week. In addition, each practitioner needs a copy. The main supply should be stored at the teacher center and each teacher should carry several copies of each module.

g. Questionnaire. One copy of each form is needed per respondent.

II-19 DESIGN STUDENT ORIENTATION AND SECURE MATERIALS

The week-long orientation serves these purposes: (a) students learn the logistics and requirements of the Practicum; (b) students become familiar with the curriculum modules and learn how to use them; (c) medical-ethics topics such as confidentiality and patients' rights are explained; (d) students learn what they can expect to do in health-care settings; (e) practitioners' expectations of students are discussed; (f) pre-tests are administered; (g) journal requirements are explained; (h) role-playing activities develop students' ability to communicate effectively with practitioners and patients; (i) students learn about the placements available to them; (j) students select the Practicum placements.

Each school must plan its own orientation. The purposes highlighted above should be met by the orientation and the following list of items should be covered. It is recommended that the orientation include presentations by and discussions with health-care practitioners to help bridge the gap between the classroom and the placements which follow.

a. A knowledgeable staff member or practitioner should explain the basic principle of confidentiality and the practical means of protecting it in health-care settings.

b. Explain the Practicum objectives students are expected to achieve.

c. Describe Practicum requirements (explore careers in at least three clusters, spend four hours a day in each placement, be punctual, dress appropriately, etc.).

d. Describe routine procedures (new placements every Monday except during the two-week investigation near the end of the Practicum; the student is to attend small-group discussions twice weekly, attend large group meetings, complete a journal entry each day, launder lab coat each weekend).

e. Tell students what they can expect to do in placements (to share some of the practitioner's tasks, to be treated like staff members, to encounter some workers who will treat them as children, not to be included in some activities, to expect some boring tasks as part of health-care).

f. Acquaint students with medical terminology they are expected to know.

g. Ask a practitioner to come and talk to students about what to expect and what practitioners will expect, and to demonstrate equipment students may encounter.

h. Be sure students know what to do if an emergency arises. If a patient has a problem, the student should immediately inform a staff member. During an emergency, a student should stay out of the way unless directed to perform some activity.

i. If a placement is not working out or if some problem arises, a student should call the teacher message center. A teacher will in turn contact the student.

j. Teach students how to take vital signs.

k. Inform students that at the end of each week a Practicum staff member will bring each student the necessary materials for the following week.

l. See that students complete resumes and pretests, and learn to identify and use Practicum forms.

m. See that students review and learn to use curriculum modules.

n. See that students understand they are to use medical libraries, to investigate careers and health problems. They may be required to read an article in a professional journal and write a review of it.

o. See that students know the purpose of the journal, how to keep one, and review a journal of a previous student (see Appendix E).

p. Distribute lab coats and name tags which students are to wear each day in their placement.

q. Optional orientation activities for independent study are found in Supplementary Activities for Student Orientation, contained in Appendix D.

II-20 JOURNALS

The journals the students keep will help them to tie together and focus their experiences. Since the instruction is individualized and no two students are doing the same thing at a given time, the journals provide records of what the students have learned about careers, medical care, patients, health-care practitioners and themselves. The journals are reviewed periodically by teachers to assess student progress and to detect problems and determine the need for background information or tutoring if it is apparent students lack basic concepts or techniques.

Students should understand that there is no one textbook for the Practicum. Modules are used to supplement learning activities, but the modules do not contain the answers. The students learn from what they do, from the people they work with, and from resource materials they encounter. Each student writes in his own journal those things he has learned, experienced and thought. Journals are a combination of factual material, a diary of events, a recording of likes and dislikes, experiences with patients, practitioners and tasks, and information about careers.

Sections from a student's journal are given as Appendix E. Students should receive copies. This example is to be reviewed and discussed during the orientation.

In one Practicum school, students used three-ring binders and wrote their journals on notebook paper. This allowed them to keep the journals, modules, forms and other materials in one place. In another school, students kept a three-ring binder for forms and modules but used theme or composition books for their journals. These smaller books were preferred by the students because they seemed more personal and book-like than the all-too-familiar notebook paper.

Practicum staff members should peruse student journals frequently, perhaps collecting a few after each small-group discussion, reviewing them and returning them to the students the next morning. Students in the Practicum field test were very upset if teachers accidentally kept their journals for more than a few hours because it broke their routine of daily recording.

Practicum staff members must determine the requirements students must meet in journal preparation and make these requirements clear to students during the orientation.

II-21 DESIGN AND IMPLEMENT STUDENT-MONITORING TECHNIQUES

Providing reinforcement and solving problems for students and practitioners is a major objective for the Practicum staff. A specific monitoring technique must be designed and followed. A technique used successfully in the trial is for a staff member to spend ten minutes with each student and practitioner, separately, on Monday or Tuesday. The staff member should inquire as to how things are going, whether there are any problems or questions or any special assistance needed. At the same time, the staff member obtains from the practitioner the completed Student Evaluation Form from the previous week. Then, in addition to asking students to bring up problems at the bi-weekly discussion groups, the staff member visits briefly with each student and the practitioner on Friday when the student assignment packets for the following week are delivered.

Although experience has shown that Practicum students are self-directed and capable and that practitioners have the best intentions, cases do occur where a placement is not working out as planned. Perhaps there is a personality clash, someone expects too much or too little, or students feel they are stuck with "busy work" and not learning much. The staff member can usually solve this problem by suggesting tasks the student might do or suggesting that a busy practitioner assign a second person to work with the student. On some occasions, the only solution is to reassign the student. All problems must be corrected very quickly since most placements last only a week.

II-22 ASSIGNMENT OF STUDENTS TO PLACEMENTS

Each school implementing the Practicum must design and implement a method for assigning students to placements. The method described below was used successfully in the field test of the Practicum. First, a list of all placements available, organized by career cluster, was distributed to staff and students. During orientation, students listed in order of preference six placements they preferred during the first half of the Practicum. Care must be taken that these choices reflect Practicum requirements for the exploration of career clusters.

To chart placements, use a wooden board (or other smooth-surfaced material) on which students' names are listed down the left-hand margin and the weeks of the Practicum designated by column headings across the top:

	June 14-20	June 21-27	June 28-34
Smith John			
Spivey, Brian			
Tom, Louise			

All practitioners' names, careers, and workplaces are listed on sheets of self-adhesive labels. The sheets are arranged by career cluster and practitioners' names appear alphabetically. A copy of each sheet is available for each week of the Practicum. The unavailability of practitioners is displayed by crossing out or not listing their names for the weeks they are not available:

Nursing Services, June 14-20

Jones, Margaret, R.N. Recovery Rm., West Hosp.	Peter, Donald, Orderly CCU, Sac. Hrt. Hosp.	Jones, Sam, LVN Geriatrics, W. Hosp.

To assign a student, a staff member removes a sticker and places it on the wooden board in the appropriate cell. Because stickers can be removed and restuck using these materials, changes in the assignment display can be readily made.

A portion of the completed board would appear as follows:

	June 14-20	June 21-27
Smith, John	Jones, M., RN Rec., Rm. West Hosp.	Giddings, Med. Dent. Hyg. 4123 - 14th St.
Spivey, Brian	Peters, D., Orderly CCU, Sac. Hrt. Hosp.	Arrow, William, MD Neorosurgery, Sac. Hrt.

To make the assignments, the Practicum staff need the lists of students' choices, the board, and labels. An attempt should be made to assign all students their first choices, preferably in the first or second week of the Practicum. In continuing through the lists, try to maintain a balance between students' preferences and their actual placements. Staff must be aware of those few practitioners who request certain kinds of students.

The same assignment procedure must be repeated in the middle of the Practicum when students list their choices for placements in the second half.

Copies of the student assignments must be given to all Practicum staff; a copy must also be kept at the teacher message center.

Although students are informed of upcoming placements, assignments are not considered final until students are given an assignment sheet (see below). It is important to remember that students must have, on the first day of each placement, a lab coat, name tag, journal, appropriate modules, Student Evaluation Form, name and location of practitioner, and time and place for small discussion group meetings. While students should be responsible for the first three items, it is better for staff members to provide the remaining items. These materials can be collected each week into packets for each student, clipped together, and prefaced by an assignment sheet:

Student: Tom, Louise
Placement: Hickey, Louise; Dentist
Public Health Hospital
1462 Elder Road

Requirements: Lab coat, name tag, long hair tied back, no jewelry
Discussion groups: 12:05--12:35, staff lounge. Staff member: Mr. Gossen

The packet for this student would consist of two copies of the curriculum module on dentistry, one copy of the student evaluation form with the student's name and the dates of the placement recorded.

II-23 CREDIT AND GRADES

Credit to be received and grading policies must be decided upon by Practicum staff, the coordinator and the school administrator. These policies should be explained to students before they enroll in the Practicum.

During the Practicum field test, students received credit for four classes because they were in placements four hours a day. Afternoon meetings, interviews and discussion groups, although taking up more than four hours, were not given credit. Time spend preparing journals was considered equivalent to time spent in homework during the regular school year. Staff had a liberal attitude toward grades. They considered the Practicum a unique undertaking and the requirements demanding, and found that the students worked harder than usual. Therefore, all students who met the Practicum objectives, participated in all Practicum activities, and completed journals as required were given a letter grade of "A". Students whose journals were inadequate or who had "cut" meetings and placements without excuses received a "B" or "C". Nearly all of the students achieved an "A".

II-24 DESIGN AND IMPLEMENT SMALL DISCUSSION GROUPS

Students in programs such as the Practicum need interaction with other students and a chance to reflect on what they are doing. Small-group discussions held bi-weekly at each health-care facility are designed to help students exchange information and evaluate their experiences. The teacher and para-professional help students see relationships among experiences, solve problems that may come up, and determine where they are in relation to where they want to be. Sometimes a health-care practitioner may be asked to come to a discussion group to answer student questions or talk about a particular career. Topics that will likely come up are why some placements appeal to students and others do not, personal likes and dislikes for particular tasks and working arrangements, career decision-making, and good and bad experiences. The discussion groups should be small enough so that they seem intimate, with not more than ten students per group. A half hour is usually enough time for the discussion.

II-25 DESIGN AND IMPLEMENT LARGE GROUP MEETINGS

In addition to the orientation, there are at least two other times during the Practicum when all the students meet together: (a) one or more meetings in which staff and practitioners present career clusters and students are invited to ask questions, and (b) a second placement sign-up session in which students list and rank choices for the second half of the Practicum.

Career information meetings. At least one career information meeting should be held during the Practicum. A practitioner or knowledgeable staff member presents each of the career clusters; these people are the nuclei of discussion groups. Students attend the group(s) in which they are most interested. The group leader may bring printed materials, give a short presentation and devote the majority of the time to questions and answers. Topics covered should include new career developments, educational requirements for careers, distinctions among the careers within that cluster and career ladders. A variation is to have practitioners speak to all students about new developments in careers, such as women in medicine or new developments in careers in pharmacy, and then allow students to break into groups around the individual speakers.

Student placement meeting. This meeting is held only once, just before the middle of the Practicum. The career investigation phase of the Practicum (the two-week placement) is discussed, and students rank their choices for this placement and for the remaining one-week placements, as time allows. Staff collect the sign-up sheets and assign students in the same manner as during orientation.

II-26 CLOSURE

At the end of the Practicum, all students and staff members come together for evaluation of students and for a discussion of student experiences during the Practicum. Student journals are collected, the posttest is given and any remaining evaluation activities are completed. Each student should write a letter of appreciation to each practitioner with whom he or she was placed.

Following these activities, a social affair might be held for students, staff members, parents and practitioners. A possible variation would include discussions among those attending for the purpose of assessing aspects of the Practicum and collecting suggestions for revising it. A printed schedule of events would help organize the final day's activities.

SECTION III

DEVELOPING THE PRACTICUM CURRICULUM

III-1 The Biomedical Practicum has its own curriculum. This curriculum, which draws upon the Biomedical Curriculum, is designed to help the students apply their knowledge to real health problems while investigating health careers and health-care settings. The Practicum curriculum uses independent study as the principal instructional strategy.

The individual curriculum segments are called curriculum modules. The design calls for one module to be developed for each major health career. To date, more than a dozen modules have been developed and are included in Appendix A. In addition, a "general" module has been prepared to help students explore those careers for which no module has yet been developed. An effort should be made to develop additional modules for career explorations which are available to students in their community but for which modules have not yet been written. In the future, it may be possible for schools to exchange newly developed modules, thus avoiding duplication of effort among school personnel.

III-2 HOW MODULES ARE USED

Before discussing the development of modules, it is well to review their use by students and practitioners. Newly recruited practitioners are given several copies of the module for their career area. They are asked to read the module before a student comes to work with them. When a student arrives, the practitioner and the student are asked to sit down and review together the module for that career area. Together they determine which of the suggested activities the student will perform in that setting. This will help both of them focus on the student's activities from the beginning. It is important that the two of them meet during the student's exploration to determine what the student has accomplished and to note any deviations from the proposed activities. Often the practitioner and student will devise a new activity. When this happens, a brief paragraph about this activity should be written and a copy given to the student's teacher. By planning and monitoring the student's activities in this fashion, the practitioner will be better able to evaluate the student at the end of the placement.

It is important that students receive the appropriate module in advance of each placement and that they read it over and mark the suggested activities in which they are most interested.

III-3 DESCRIPTION OF A BIOMEDICAL PRACTICUM CURRICULUM MODULE

The module is divided into the following sections:

A. Introduction

B. Career information

   1. personal qualifications

   2. education

   3. salaries

C. A list of possible career exploration activities, including references to Biomedical Curriculum and estimated time needed for the activity. See Appendix A which contains all modules developed to date.

III-4 HOW TO DEVELOP A PRACTICUM CURRICULUM MODULE

Gather and Review Information Describing the Career. First, a well-stocked and up-to-date file of career information must be available. This information--largely descriptions of careers, typical activities, required information and

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salary--is used to prepare the first four sections of each module (introductory remarks, personal qualifications, education and salary information).

It is usually necessary to read all the references on a particular career in order to develop an accurate understanding of the career. Some information may be slanted favorably toward the career, some may be inaccurate or out of date. In the case of relatively new careers, there is often little or no written information available. In these cases, reasonably accurate information can be gathered by interviewing several persons in the career and, when possible, talking about the career with personnel directors and administrators of hospitals and clinics. (See the list of health career clusters, Appendix H.)

Arrange for Expert Assistance. Next, secure the assistance of a practitioner in the career who is willing to donate a few hours to help you develop the module. Most people are happy to help with this aspect of Practicum preparation, expecially when they understand that their knowledge about the career, combined with the teacher's knowledge of the curriculum and the students, will produce the best possible module.

It is useful to provide the practitioner with the following written materials: an outline of the Biomedical Curriculum, a brief description of the Biomedical Program, a description of the Practicum, sample Practicum curriculum modules and, if possible, an example of another practitioner's work in module development. (See the example in Appendix F.)

The first meeting with the practitioner should begin with an explanation of the goals and content of the Biomedical Curriculum, illustrated with the appropriate printed materials as described above. Second, tell how the Practicum fits into the Biomed Program, offering students a chance to explore health-care careers and facilities. Third, show how the modules are used in the Practicum, using a sample module to emphasize your point. Explain that you need to verify the career information you have obtained from which to write the introductory parts, and that you need a list of suggested activities that students will be able to observe and perform as indicated in the sample modules. The practitioner should draw from the outline of the Biomedical Curriculum in proposing these activities. Stress that the activities should favor hands-on experience--doing rather than observing.

When the practitioner understands what is needed, allow one or two weeks for the work to be completed. Set up, in advance, a second appointment to retrieve and review the practitioner's work. (Allowing more time or leaving a second meeting more flexible tends to result in procrastination.)

Arrange for the second meeting--to pick up the material--to be held at the practitioner's place of work. A tour of the facility will help the curriculum developer better understand the practitioner's suggestions and to prepare a much more realistic and interesting module. Review with the practitioner the written activity suggestions. Whenever something is suggested which you do not understand, ask for a demonstration.

It is helpful to obtain from the practitioner answers to these questions:

1. What is a typical day at work like for you?
2. How much independence and autonomy does someone like you usually have?
3. What state and federal regulations pertain to someone in your occupation?
4. What special equipment and dress will students need in order to be placed in your facility?

The answers to these questions will be helpful in writing the informational sections of the module.

Drafting the Module. The next step is to prepare a draft version of the module. It is important to prepare the draft soon after the visit; otherwise, perceptions and ideas dim. (Instructions for preparing the modules follow.)

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When a draft is prepared, send a copy to the practitioner. Ask the practitioner to review it and suggest any changes before it is duplicated. If there is no rush, the comments can be mailed back. At other times it may be necessary to drop off the draft and telephone soon after for editorial suggestions.

At the end of the module, a footnote might be added thanking the practitioner who helped develop the module.

III-5 INSTRUCTIONS FOR PREPARING CURRICULUM MODULES

(Refer to Appendix A for examples of curriculum modules.)

Career Title. The first section is a one- to three-paragraph introduction to the career being covered in this module. It has two purposes: to interest the student in the career and to give the student enough background information about the career so that the student can tell where a person in that career fits into the health team.

The section can begin with whatever you choose; it is best to begin with the most exciting paragraphs you have written. Often, modules begin with a description of the facility in which a person in this career works. The activities that go on, the equipment involved, and the patient-staff relationship typical for people in the career are usually covered in this paragraph.

The second paragraph usually covers the regular tasks performed by a practitioner in the career. It may explain the relationship between the practitioner and the administrator in that area, other staff involved in that aspect of teampower, and any unusual aspects of the career.

The third paragraph may discuss specializations available to people in the career. Often, if a novel or non-fiction book would be an interesting accompaniment to the career exploration, a reference is made to the book and a short description given. Career ladders may be discussed, as well as mobility among similar careers.

Personal Qualifications. Particular personal characteristics and personality traits are often said to be optimally desirable in people entering certain careers. These traits may include such things as aggressiveness, ability to make people feel comfortable, a predilection for order, an ability to work amidst chaos, or interviewing capabilities. Physical characteristics such as good vision, manual dexterity and strong hands and arms may also be desirable qualifications for jobs; these should be cited in this paragraph.

This paragraph can be related to a Practicum activity in which students assess the people they meet in the career to determine whether these qualifications do indeed seem necessary.

Education. This paragraph is an explanation of the educational requirements for people in the career being covered. The information in this paragraph usually includes recommended high school background, information about admissions to appropriate training programs (for example, when to apply, number of applications vs. number of acceptances and any hints about applying), a listing and brief description of the training program (types of classes required, labs, practical experience, etc.) and incidental information (such as noting that a particular program is very demanding and will allow little free time). When practical, a listing of colleges and other institutions offering the required training is given, as well as the name and address of any national organization(s) which might have additional information on the career, schools which offer the training, and financial aid.

If licensing, passing a state or federal examination, or other such credentials are needed in this occupation, they should be described at the end of this section.

Salary Information. Most students are interested in knowing how much people earn in various careers. Career ladders can often be illustrated with salary information as well. Benefits are discussed in this section; emphasize unusual situations associated with a particular career (e.g., dental hygienists typically get no--or few--benefits).

The Practicum field test staff experimented with giving salary information in dollar amounts (e.g., earn an average of $19,000 per year), but abandoned this practice because it was so hard to find accurate information about some careers, because salaries vary greatly across the United States, and because salaries change considerably from one year to the next. We developed a salary chart in which careers were divided into five salary groups. (See Appendix G.) Then we listed the group in which the salary fell for each career. Students could then compare among groups in terms of "higher salary than" or "lower salary than." They can find dollar amounts by reading classified ads or asking personnel officers in the facility they are working in.

Career ladders can be explained in terms like these: "Salaries for workers in this career commonly fall into range 3; however, with additional experience and an advanced degree, workers often reach range 4, especially if they assume a supervisory position."

When differentiating between, say, associate and bachelor's degrees, salary information often helps to point out the difference.

Practicum Activities. This section of the module is usually two to four pages in length and spells out about ten activities students can typically observe or perform when exploring the career. There are many things to consider when developing these activities.

1. Activities within the students' ability should be emphasized. Routine clerical activities (such as answering phones, filing and typing) should be minimized.

2. Emphasize activities which students can do and which are both meaningful and important in the students' eyes. For example, in a medical laboratory students cannot run patients' samples; it is not wise nor legal to suggest that untrained, unlicensed people perform a lab test. However, there is no reason students cannot rerun patients' samples and compare their results with those the practitioner obtained. Or, students can run tests on their own blood, urine, etc., and have the results checked by the medical technologist.

3. Activities should be representative of the typical tasks that the practitioner performs. For example, if 40% of the practitioner's time is spent writing reports on the way the patient was treated, setting up future appointments and monitoring patient's progress, then these activities should be reflected in the activities the students perform in the career exploration. For example, if writing a module on physical therapy, showing only practitioner-patient relationships and actual therapy would be unrealistic, for a large part of the the therapist's time is taken up in reading patients' charts and physicians' recommendations and sterilizing and preparing equipment for patients. It is important that students see both sides of the job--the exciting parts as well as the "behind-the-scenes" activities.

4. Activities which students can perform on their own, without supervision, should be included. The purpose of such activities is that there will be times when the practitioner, because of a meeting, an emergency or other consideration, will be unable to meet and work with the student as planned. This will happen to almost every student almost every week. Consequently, it is important that the student find something to do and not just sit around waiting for the practitioner. Such activities include using the medical library to research a particular problem related to the career, interviewing or helping patients, casually conversing with free staff members about their careers and about the relationship of their careers to the one the student is exploring, and so forth.

5. Activities we have tried and found to work well include the following.

a. A tour of the facility which introduces the student to the floor plan and rules and regulations of the facility. Students can also see the equipment and materials that workers typically use and perhaps watch a few people on the job. Students should begin to get an idea of where the practitioner fits into the medical team.

b. A good second activity is having the student track a typical patient through the facility. It is good to suggest tracking a new patient so that the student can learn about all the different forms that are kept on patients. The student can then observe the rest of the patient's activities in the facility, usually up through completion and exit. Observing several such patients is usually a good first day's activity and gives the student a reasonable grasp of what the facility and practitioner do.

c. Analyze the interpersonal and bureaucratic relationships observed among people who work in the facility and the patient-practitioner relationship.

d. Learn to perform tasks which are typical of the career under investigation. This might include taking and analyzing X-rays, sterilizing equipment and instruments, setting up for patients, patient education, preparation of patient records, etc. Suggest activities which reflect a lot of variety and which meet the criteria listed above.

e. Learn the terminology of the career area. This activity will enable students to interpret what people are talking about and better understand the treatment being administered or prescribed. An activity that introduces vocabulary is helpful.

6. It is helpful to preface each suggested activity with a performance (behavioral) objective. This makes it easier for teacher and practitioner to evaluate the student's progress.

APPENDIX A

BIOMEDICAL PRACTICUM CURRICULUM MODULES

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Biomed Practicum
Curriculum Module

GENERAL

The Biomed Practicum staff has developed curriculum modules for some twelve health careers. It has not been possible to design student activities for more careers prior to the start of the summer 1974 program. Consequently, the following suggestions for student activities have been developed. Students are expected to spend an average of four hours per day for five days at each placement site. The following suggested activities, therefore, should comprise a twenty-hour, or one-week, sequence. It is recommended that the health-care practitioner and Biomed student read over the suggestions together and add the 'specifics' where generalizations appear. The resulting activity plan should be relayed to the student's instructor.

SUGGESTED ACTIVITIES.

1. It is useful to begin your activities at a new site with a tour of the facilities. Find out how the department which you are studying fits in with the larger organization. Afterwards, explore the department itself, with the guidance of your supervisor. Learn what levels of staff there are, what their jobs are, and how their tasks are related. Spend a few minutes at each 'station,' watching the staff member at work.

Some questions you might ask are:

a. How many people work in the whole organization? How many in this department? Who is in charge?

b. What tasks is each unit/staff member responsible for? How do their tasks relate; who assists whom?

c. What do your supervisor and other staff members expect of you? How much help and supervision do they expect to give you? To what degree do they expect you to initiate and direct your own activities? What departmental standards and regulations do they expect you to meet? Are there any legal constraints which will affect what you can and cannot do?

Based on your tour, what would you like to do for the rest of the week? What activities interested you most? (Try to get a good cross-section of the department and the typical activities performed in the department.) (2 hours)

It would be a good idea to keep notes on what you've learned and to pull this information together in your journal as the week progresses.

2. Continue exploring the department. Find out how patients are handled. How is the department notified that a patient is coming? How are records, charts kept? What relationship does the department have with the patient's physician? How are appointments made? What kinds of patients visit the facility? The department? What treatments do they receive? How often? (If this is a setting which does not have direct contact with patients/clients, what relationship, if any, do the activities which you observe in this setting have to patient/client care?) (2 hours)

Field test version: 6/14/74

3. While learning more about the questions in activity 2 above, try tracking a patient through the department. Read over the patient's record (or, if it is against policy for you to read a record, ask someone to summarize); find out why the patient is coming, what the department/unit will do for the patient, where the patient is headed next; afterwards, discuss the patient's treatment with your supervisor and/or with the person who treated the patient. Depending on time, your interests, and the departmental situation, track other pateitns for the rest of the day. Try to track patients who have different disorders and/or who are seeking different kinds of treatment. (4 hours)

4. On the third day, try to get some 'hands-on' experience in the unit/department. Work out a series of tasks with your supervisor; some possibilities are: developing X-rays; sterilizing instruments and equipment; recording patient histories; assisting patients/department staff; receiving X-rays; charts and/or slides which illustrate patient disorders/conditions such as cysts, tumors, dental problems, pregnancy, disease presence, etc.; preparing instrument/equipment set-ups, and so forth. (4-10 hours)

5. If there are several units or staff levels within the department, try to help out and observe with each one. For example, if you were in a physical therapy department, you might spend one day with the therapist, one with a therapy assistant, and one with a therapy aide. This would give you information for comparing the jobs of people with the same interests but probably with different education and experience. (4-10 hours)

6. Consider how each career would fit you; try them on for size and comfort. Evaluate your response from several points of view: kinds of tasks performed, years and kind of education required, working conditions, salary, benefits (such as vacation, retirement, insurance), responsibilities, advancement possibilities for workers in each career, and relationship to other employees, tasks, and departments. (2 hours)

7. Learn new words you hear/read in the facility. For example, you will find technical words on patients' charts and records which you may not have seen before. Find the meaning of these words; you might want to keep a list of new words in your journal. One practitioner said recently that if a Practicum student learned ten new words a day each day of the summer program, that student should be able to read and understand almost any patient's record. Do you think this is an exaggeration? Or is it fairly accurate? (2-4 hours)

8. Interview a patient (or several patients). Focus your interview on these questions:

a. What is the process of health care the patient followed (for example, how did he/she become aware of need for care, what kind of care was first sought, what referrals were made)?

b. Does the record agree with the interview?

c. What has the patient liked most/least about the care he/she has received?

d. Does the patient see any barriers to his/her own present/future health care? (Examples of barriers are: age, sex, adequacy of health insurance, ethnic group, transportation, language difficulty, conflicting religious beliefs, low self-control, squeamishness, and many others.) Do you sense any barriers the patient did not mention? (4 hours)

9. If there is a medical library at the facility you are exploring, learn how to use it. When you have spare time, or when staff are too busy to work with you, do some research on the disease, injury, or treatment of a patient who interests you. (1-6 hours)

10. Explore the insurance office of the facility. One interesting problem to research: Retired people on Medicare often pay extra each month to buy Medicare A and B plans. In addition, some pay up to $50 each month for additional health insurance. Are all of their medical costs covered? Are rest homes paid for? Is preventive medicine paid for? Medical social work (counseling) covered? (1-2 hours)

11. Does the facility you are visiting have a manual for patients and visitors explaining the functions of the various departments and services? If so, read over the section for the department you are exploring. Could the description be improved? Updated? If there is no manual, draw up an outline of such a manual. Discuss it with several staff members. Write a section for the manual which would describe the department you are in well enough to answer most of the questions which patients and visitors might have. You may even need to interview a sample of patients and visitors to find out what kinds of questions they have. (2-6 hours)

Biomed Practicum

Curriculum Module

DENTAL HYGIENIST (PRIVATE PRACTICE)

The dental office or clinic is a busy center that must be conducted with medical and administrative efficiency. Effective delivery of dental health care requires thorough preparation, proper handling of equipment, and an atmosphere that is both immaculate and organized. The dentist must see that such conditions are maintained in addition to fulfilling his duties to patients and dental research. To meet these demands, the dentist relies on the talents of a trained staff. Administrative details, technical work with patients, and skilled work with dental pieces become the responsibilities of various dental assistants and technicians.

Human involvement--the opportunity to combine the tools of a skilled technician with the encouragement and understanding of a teacher--is available to the qualified Dental Hygienist. Primarily, the hygienist's job is to clean teeth, to recognize defects, and to instruct patients in the proper techniques of dental care. He/she works under the supervision of a licensed dentist and can aid both the dentist and the patient by promoting dental health education and preventive aspects of dental care. The hygienist's duties may take him or her into public and private elementary schools for further instruction on the methods of dental health.

Legislation was recently passed in California authorizing education and certification of dental hygienists in expanded functions. Such hygienists will be specifically trained to carry out some functions-such as filling teeth-which are now performed only by dentists. Educational programs and certification requirements are being worked out in 1974-75; little information is currently available.

Personal Qualifications.

The dental hygienist must have natural or acquired manual dexterity and good vision. Work with delicate tools requires the hygienist to be both deft and gentle. Involvement with people demands a sincere interest in them as well as the ability to explain persuasively the techniques of proper dental care. Of particular value is the ability to get along with children.

Education.

The dental hygienist may choose between a two-year professional training course or two years of college coupled with two years of dental hygiene training. An associate degree in dental hygiene is awarded upon completion of the two-year program. A four year student receives a baccalaureate degree in dental hygiene.

Currently there is high competition for admission to both two-year and four-year dental hygiene programs. High grades from high school are a help in gaining admission, as is a commitment to complete the college program. It is often helpful to apply to the college program in person rather than by mail.

A college program in dental hygiene is not easy; classes often run from 8-5; sometimes classes and meetings are held in the evening as well. Students do not have a lot of free time.

California colleges which offer a four-year program are: University of California, San Francisco; University of Southern California; and Loma Linda University.

Colleges which currently offer a two-year program are:

Northern California:

Diablo Valley College (Pleasant Hill)
Chabot College (Hayward)
Sacramento City College (Sacramento)
Fresno City College (Fresno)
Cabrillo College (Aptos)
Foothill College (Los Altos)

Southern California:

Pasadena City College (Pasadena)
Los Angeles City College (Los Angeles)

If you would like more information about this career or about sources of financial aids for education, write: American Dental Hygienists Assn., 211 E. Chicago Avenue, Chicago, Illinois 60611.

Salaries.

The qualified dental hygienist's salary is generally commensurate with his/her professional training. Two-year graduates earn between $6,000 and $10,000 annually, while those holding a bachelor's degree in dental hygiene may earn $13,000 or more a year. Salaries vary greatly according to geographic location. Hygienists are usually paid one of three ways: salary, commission, or hourly wage; pay is usually negotiated between the hygienist and the dentist. Although pay is excellent, fringe benefits--retirement, vacation pay, sick leave, life insurance, disability--are rare for hygienists in private practice. On the other hand, it is common for hygienists to work only four days a week and to take one or two months vacation (without pay, of course) and still earn a high salary.*

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*Above information adapted from *Health Career Facts*, Health Careers Program, P.O. Box 4387, Madison, Wisconsin 53711.

PRACTICUM ACTIVITIES

1. Tour the office with the hygienist who is coordinating your activities. He/she will explain the purpose of the layout of the office and the function of the equipment and materials needed by the hygienist and the dentist. The tasks of the hygienist and dentist are distinctly separate but closely related. Some questions you should answer on this tour: What is the function of the dentist and the hygienist? How do they work together? How do they communicate? (1-2 hours)

2. Follow a patient from the time he or she enters the dentist's office to the end of the visit. It would be especially interesting if this were a new patient or that you could observe the history-taking procedure the beginning of the visit. What kinds of information about the patient do the dentist/hygienist need? How do they use this information? How cooperative was the patient in providing the information? While discussing these questions with the hygienist, it would be interesting for the two of you to read and compare two or three patient histories which indicate potential problems to the dentist and hygienist. What are typical problem indicators? How are patient histories recorded and kept for the dentist/hygienist's use?

Next, accompany the patient to the hygienist's work area. Observe the steps the hygienist follows in treating the patient. X-rays are usually taken, developed and mounted at the beginning of the session. Only a certified practitioner can take x-rays, but you will be able to develop and mount them after you have learned how from the hygienist. While the X-rays are being developed, find out how they are used by the hygienist and by the dentist. What can a hygienist tell from an X-ray about a patient's needs?

The hygienist then will examine the patient's mouth, explaining what is being checked as he (she) works. Scaling--removing calculus--is the next step, and requires using several different tools. Note which tools are used and the way the tools are handled before and after use.

When this is completed, the teeth are polished and, often, treated with fluoride. Frequently, a patient's poor dental habits cause or worsen undesirable mouth conditions such as receding gums, excessive plaque and calculus, and so forth. Patient education is an important part of the hygienist's activities with these patients.

When the hygienist has finished, the patient is examined by the dentist who treats both teeth and mouth problems such as cavities, infections, receding gums. Compare his/her activities with the hygienist's. Last, observe the patient checking out--making arrangements for billing, insurance, future appointments, and related things.

Afterwards, return to the hygienist's work area and observe his/her activities with another patient. Which of the procedures followed are the same and which are different? If any changes were made, what was the reason? Does the hygienist's personal manner--conversation, time, technique--vary from one patient to another? (Afterwards, talk over the day's experiences with the hygienist. It might be useful to plan your next day's activities as well.)

3. Learning to develop and mount X-rays is an important part of a dental hygienist's education. You can learn to do both with the dental hygienist. Go over the X-rays you have developed and find how to distinguish and record decay, bone loss, abcesses, supernumerary, tumors, cysts, impactions, and other pathology. Try this yourself on the next set of X-rays; take notes on what you find and go over them with the hygienist. (2-3 hours.)

4. The dentist and hygienist treat a cross-section of mankind; their patients usually run the gamut across ethnic groups, ages, patient personalities, and attitudes toward ethnic care. The dentist and hygienist see as part of their job the education of patients in better dental care. At the same time, they try to motivate the patient to take better care of his/her mouth and teeth. The dentist and hygienist may use different approaches to educate and motivate different kinds of patients. Be alert to the tactics they take with the aged, children, ill-humored, and other types of patients which interest you. Body language is another part of this psychology; find out what it is and how the dentist, hygienist, and patients use it. Devote a few pages of your journal to the psychology of dentistry, the way you saw it practiced. (2-4 hours.)

5. Geriatrics (the aged) are usually ignorant of dental problems they may have. People tend to believe that once they have false teeth, it is no longer necessary to visit the dentist. Consequently, ill-fitting dentures and the accompanying bone destruction often go untreated. How would you approach the dental education of the aged? Gather some information and develop an educational brochure or oral presentation for the aged. (4-10 hrs.)

6. After each instrument has been used, it must be sterilized. The hygienist will teach you to prepare instruments for sterilization and operate the sterilizer. (2 hours.) (Lesson #51, Nutrition Unit, deals with sterilization.)

A related homework activity is to take a culture from a few of the instruments you've sterilized to find whether they are really sterile. (See Lesson 1 in Neurophysiology Unit for a review of culture preparation.)

Questions you might ask: What kinds of organisms might be transferred among dental patients? Are the same sterilization techniques used on all instruments? In every office?

7. After watching the hygienist prepare instrument set-ups, do the next set-up yourself; the hygienist will review your performance. You may continue to prepare the instrument set-ups for the rest of the week, if you wish. (1/2 or more hours.)

8. Again, follow a patient through his or her session with the dental hygienist and the dentist. Evaluate the effect of the sounds in a dental office on the patients' emotions. You might evaluate:
   a. the sound of the drill
   b. the use of dental jargon
   c. various types of music
   d. water running, dripping
   e. the scraping of scaling instruments on the teeth.
(1 hour.) (See Neurophysiology Unit, Lesson 4.)

9. Nitrous oxide, or "laughing gas," is used by some dentists as an anasthetic for their patients. It may be possible for you to experience this anesthetic, provided there is a licensed person working in the dentist's office who is willing to administer it to you. Record the physiological changes you experience: How long does it take the anesthetic to take effect? What does it feel like at first? When the effect is full? As it is wearing off? Which parts of your body are affected most? (1-2 hours.) (Respiration Unit, Lessons 15 and 36)

10. Ultrasonic apparatus is often used in dentistry, largely for sterilizing instruments and for gross removal of calculus from teeth or dentures. Note how the hygienist tunes and uses the untrasonic scaling instrument. What is the purpose of the water used with the ultrasonic equipment when it comes in contact with flesh? Some hygienists are said to rely too heavily on ultrasonic scaling; why are they criticized? (1-2 hours.)

11. As some of us have learned the hard way, dentists do a lot more than fill cavities - sometimes they prepare root canals, treat periodental problems, and extract teeth, among other things. If possible, spend some time watching the dentist perform these activities. As a lead-in, find out what part, if any, the hygienist played in the diagnosis and treatment of these dental problems. Prepare a short essay in your journal on what you learned about these special dental problems; include your feelings about watching. (2-3 hours.)

12. Not all patients are well informed about dental problems and care; in fact, each month hygienists will probably see two or three adult patients who have never been to a dentist before. Be alert to patient misinformation and lack of treatment; how do the hygienist and dentist react to these patients? What advice and education do they give these patients? Keep notes on such occurrences and, at the end of the week, summarize what you saw and learned. (2-4 hours.)

13. You can chart with the hygienist, once he or she has shown you how. In order to chart, you must know the names of the teeth, as well as the names of the surfaces. The names of the surfaces are: mesial (closest to the midline), distal (furthest away from the midline), occlusal (biting surface), buccal (named after the buccinator muscle in the cheek), and labial (against lip). A mesial-occlusal (often called M-O) cavity would contact two surfaces, for example. As the hygienist calls out peridontal pockets

(including depth of pockets), caries, missing teeth, etc., you can record properly on the chart. You might be able to photocopy some charts you did to put in your journal. (2 hrs.)

The Biomed staff thank Ms. Sandy Bushmaker-Ridiough of San Francisco, California, for her help in developing this module.

Biomed Practicum

Curriculum Module

EMERGENCY MEDICAL TECHNICIAN (AMBULANCE)

The ambulance was originally a mobile field hospital. *The Sword and the Scalpel* is a very engaging autobiography of a doctor who first designed and used ambulances to perform blood transfusions on the battle field during the Spanish Civil War. Needless to say, this innovation saved countless lives. Our ambulance service today provides both emergency and non-emergency service to the sick and injured. The emergency medical technician (EMT) must have an in-depth knowledge of first aid and the ability to apply that knowledge in a wide range of situations. There is a current trend toward upgrading the quality of ambulance service primarily through more intensive, selective training of the EMT paraprofessionals.

The EMT handles both non-emergency calls (such as routine transfers of patients from hospitals to nursing homes or transporting elderly people to a hospital for tests) and emergency calls (such as auto accidents, coronaries, and rescue extrication operations). Many times the dispatcher who receives the initial call for help cannot tell whether or not it is an emergency. For instance, one dispatcher received a call from a person who said his brother had fallen through a plate glass window. This information was transmitted by radio to the EMT crew in the field who then rushed to the given address. They found no broken glass, no injured brother, but rather a person badly in need of psychiatric treatment.

The above example typifies the relationship between the dispatcher and EMT crew, but also points up the needed interaction between the EMT crew and the police department. Anytime a patient is admitted for psychiatric treatment or the ambulance is rolling on a code 3 (life and death), the police are notified. Good working relationships among the ambulance service, police and fire departments, and hospitals are essential to the proper care and efficient handling of patients.

An EMT handles an average of six to eight calls a day. He/she works an eight-hour day but is on-call around the clock (except for his/her two days off per week). Let's look more closely at the steps an EMT goes through during an emergency call. A call comes into the office: a person is having difficulty breathing. The dispatcher (whose phone is on a recorder) gets the person's address, phone number, name, and city and notifies the crew to get on the road. The crew begins to roll on one of the following codes: 3 = life and death; 2 = urgent but not a threat to life; and I = at our convenience (up to one-half hour). The ambulance rolls code 3 to the scene (1097 = at scene) and immediately evaluates the patient's condition. The EMT checks for chest pain, breathing, color, and pulse and listens to the lungs. The patient's age, chief complaint, prior and present pertinent medical history, the patient's doctor, any medication injested, and the e.t.a. (estimated time of arrival)

Field test version: 6/9/74

are all relayed (if applicable) to the hospital via the Med Net (a system of communication with all hospitals with emergency rooms). The patient is then put into the ambulance and his/her vital signs are monitored.

The time the ambulance started rolling, the code, the time of arrival at the scene, and the time of arrival at the hospital are all recorded in a log book as a matter of public record. This record has vital legal significance.

It may be a nurse or a doctor who meets the ambulance when it arrives at the hospital and all the information sent via the Med Net is repeated to him or her. The EMT also reports anything observed en route and then asks what needs to be done next (possibly an EKG, X-ray, electric monitors, etc.). At this point, a good relationship between the individual EMT and the hospital staff will greatly benefit all concerned. The suggestions of a competent, tactful EMT will be appreciated by the hospital staff and can significantly help the patient receive the treatment he/she most urgently needs.

Once the patient is safely in the hands of hospital staff, the EMT returns to the ambulance and is available for the next emergency call.

PERSONAL QUALIFICATIONS: It must always be remembered that the EMT is dealing in a service to the community and to the hospital. Given that it is a much-needed service, the EMT is still trying to sell him/herself and a service. A person in this job must be observant, cordial, in good physical condition and have an aptitude for details. Each ambulance is equipped with thousands of dollars of intricate equipment which must be skillfully handled. EMT's work under pressure which necessitates the ability to make intelligent, calm decisions and use good judgement and tact. EMT's have no idea what kind of situation they will encounter on a call: family fights, psychotic behavior, or hysterical relatives who lost a loved one. Therefore, this position demands a great deal of flexibility. Often, elderly and very young people think an ambulance is the last thing before the hearse. An EMT must be able to communicate to people in plain English, avoiding medical jargon and terminology. An EMT soon learns that it is important to be empathetic, to let the patient know the EMT is concerned and genuinely willing to help in any possible way.

EDUCATION: Training for an emergency medical technician (ambulance) usually includes 90-100 hours of in-depth first aid instruction, covering anatomy, physiology, terminology, and medications. A good course will emphasize the "why" behind various types of treatment. When seeking out a program, note the attention given to a balance between the theoretical and the practical application. In the Bay Area, an EMT course is currently being offered at Chabot College, Hayward, California, and at North Peralta Junior College, Oakland. The best way to find out about additional training programs would be to call ambulance services themselves and ask the EMT's where they received their training.

An applicant must be 18 years old, pass a physical exam, and pass an EMT (ambulance) exam in order to receive an Ambulance Driver's Probationary License.

SALARY: For a private company, the EMT earns between $8,000 and $10,000 a year. With additional training this figure can run as high as $14,000. For an EMT in a supervisory position, the salary ranges from $13,000 to $16,000.

Salaries are significantly higher for those EMT's working for a municipality.

PRACTICUM ACTIVITIES

1. A good way to begin your experience is to study the staffing levels within the ambulance company. What are the duties of the personnel involved in operating the company? How are their tasks related? Spend a few minutes with each staff member and get a sense of his/her duties. Write a section for your journal in which you describe the jobs of these people. (2-4 hrs.)

2. Ride along with the EMT's on as many calls as you can. Try to accompany them on code 1, 2, and 3 calls. Keep an account of your experiences for your journal; also discuss the questions below. How did you react emotionally to the call? How did the EMT's react? What procedure was followed? How was the patient handled? Were observers present when the ambulance arrived? If so, how did the EMT's react to and handle the observers? Do different crews react in different ways? How do patients react to the EMT's? To the ambulance? Did the EMT's encounter any special problems (such as hysterics, excessive hemorrhage, incorrect address) on the calls you were out on? If so, how were these problems handled? What happens if a patient dies en route? (10 or more hours)

NOTE: You will find that EMT's have a lot of "down time" between calls. The activities below are good ones for you to undertake during this down time.

3. Make a comparison of the type of training each EMT has had (where, for how long, what was covered). Are there any training drills? What are CPR cards? How often are CPR cards reviewed? Why are CPR cards needed? What kind of training do you think is best? Why? (Discuss this topic in your journal.) (2-4 hrs.)

4. In-service training is often given to EMT's. What type of in-service training is usually available? What are some examples? If possible, accompany an EMT to an in-service training class. (1-4 hrs.)

5. What are the legal constraints surrounding the work of an EMT? If a fireman and EMT disagree at the scene regarding treatment, who has authority? Why? Does this authority seem reasonable given type of training? Experience? (2 hrs.)

6. Learn the function of all the ambulance equipment. In your journal, make a list of the machines, how they are used and for what purpose. (Example: How do you know when to use a defibrillator?) Which types of restraints are best? Why? What kinds of bandages are most frequently used? Are some better than others? (4 hrs.)

7. Ambulance services are often called to court. If possible, accompany a company representative to a court hearing. What information is needed? Is the log book considered to be an accurate, complete source of information? What are the most common reasons an ambulance company is taken to court? How could service be improved so as to reduce or eliminate the reasons for which a company is usually taken to court? (4-6 hrs.)

8. The driving and maintenance of the ambulance itself are important. Who drives the ambulance? Is a special license or certificate necessary for an ambulance driver? How is the ambulance maintained? Who does the work? A mechanic? Who is responsible for the upkeep of the interior of the ambulance? What does this upkeep consist of? (2-4 hrs.)

9. What is the job market like for an EMT? What is the turnover rate at the company you are with? Are job opportunities equal for men and women? Is a high turnover of personnel beneficial or harmful to the ambulance company? How could rate of turnover be reduced, if this is desirable? What possibilities are there for salary increase or promotion for an EMT? (2-4 hrs.)

10. Describe the relationship between an EMT and hospital staff. The EMT provides more than transportation when bringing in a patient; he/she gives information about the patient to the hospital staff. What kind of information? How much time does the EMT spend with the hospital staff? Do you feel that this relationship could or should be changed? What changes should be made and what are your reasons for suggesting these changes? (4 or more hours)

11. Would you like to be an EMT? Discuss this question in your journal. Do you have the necessary personal qualifications? Where/how would you get the necessary education/certificate? How would you react to the schedule an EMT must keep? Is it easy for an EMT to be married and raise a family? What is the most exciting part of an EMT's job? The most boring part? What about the job appeals to you? What does not appeal? (2 hours)

The Biomed Practicum staff thank David St. Onge, Fremont, California, for his help in developing this module.

Biomed Practicum
Curriculum Module

MEDICAL LABORATORY CAREERS

MEDICAL TECHNOLOGIST, CERTIFIED LABORATORY ASSISTANT
CYTOTECHNOLOGIST, HISTOLOGIC TECHNICIAN

In a medical laboratory, the pathologist is assisted by a variety of trained personnel who protect health and aid in the diagnosis and treatment of diseases. Although these laboratory workers may never meet the people they serve, they are instrumental in tracking down the causes of disease and determining its presence, absence or extent.

While working with complex laboratory instruments such as microscopes, spectrophotometers, electronic counters, analyzers, and cryostats, laboratory personnel need an array of skills and attributes. The skills are acquired during the necessary educational programs but the attributes of scientific interest, manual dexterity and reliability, steady nerves and cooperativeness must be innate.

Population growth, research expansion, the trend toward preventive health care, and government health programs have resulted in an increased demand for laboratory personnel. Labor projections indicate that the total number of laboratory personnel will have to increase from 130,000 in 1967 to over 200,000 in 1975.

Laboratory careers offer boundless opportunities for men and women and for individual abilities, aptitudes and interests. One may start at the bottom rung on the career ladder and, through further education, work himself up to the key position of medical technologist.

The Registry of Medical Technologists of the American Society of Clinical Pathologists (ASCP) offers certifying examinations for the laboratory careers discussed below. In all cases, those who pass the exams will receive higher salaries and can advance further than those who are not certified.

MEDICAL TECHNOLOGIST

The medical technologist works directly under the supervision of a physician, carrying out a variety of laboratory procedures. The technologist must be able to count blood cells, do blood groupings, make chemical tests of body fluids, prepare tissue specimens, identify micro-organisms found in air, milk, water and body materials, and perform a host of other tests too numerous to list. The technologist's tools are complex: electronic counters, automatic analyzers, centrifuges, microscopes, autoclaves, spectrophotometers, colorimeters, microtomes and many more. Using his instruments, the technologist seeks

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out information and gives it to a physician--usually a pathologist, who is a specialist in the detection of disease by laboratory methods. The pathologist interprets the results of the tests and uses these findings in preparing the final report or recommendations for the attending physician.

PERSONAL QUALIFICATIONS: Medical technology was once a career primarily for women, but more and more men are entering the field today. Anyone considering the profession should be good in science, should like laboratory work and should be naturally neat and accurate. Also needed is the ability to do careful, reliable work even under pressure.

Physically, medical technologists must be skilled at using their hands, working with small instruments and delicate equipment. Good health, normal vision and ability to distinguish fine shades of color are necessary assets.

EDUCATION: The minimum education needed to become a registered medical technologist is three years of college and one year of training in a hospital school of medical technology. Students considering medical technology as a career should start by taking as much chemistry, biology, and mathematics in high school as possible. Most college medical technology programs are four years which include one year of clinical "in-hospital" training as the senior year. However some private colleges have medical technology programs that do not include the clinical "in-hospital" training. A student attending one of these colleges must then attend an additional "in-hospital" training program for one year, thus making it a five year program.

Educational expenses for the first three years of college vary, depending on the school. They would be about the same as for college study in any academic subject.

All medical technologists must take an examination to qualify for certification by the Registry of Medical Technologists of the American Society for Clinical Pathologists and the American Society for Medical Technology.

SALARY: Salaries for medical technologists are good and getting better as the demand increases and research turns up new, more demanding challenges for their skills. Medical technologists starting work today can expect beginning salaries of $8,000 to $12,000 depending on the size and scope of the laboratory.

CERTIFIED LABORATORY ASSISTANT

Under the direct supervision of the pathologist or medical technologist, the Certified Laboratory Assistant (CLA) performs routine laboratory procedures such as collecting blood specimens, grouping and typing blood, preparing and staining slides, and examining urine, blood and body fluids microscopically.

EDUCATION: A high school diploma will qualify an applicant for the 12-month required training program in an AMA-approved School for Certified Laboratory Assistants. The course, consisting of formal instruction and practical application, emphasizes precise procedures in addition to sources and detection of errors.

SALARY: Starting salaries range from $6,000 to $8,000 annually.

MEDICAL LABORATORY TECHNICIAN

A CLA may advance to the position of Medical Laboratory Technician (MLT) with further training. At the middle level of responsibility, the MLT assumes more complex procedures than the CLA but does not have the supervisory or teaching assignments of the medical technologist or pathologist. MLT's can continue their education to become medical technologists.

EDUCATION: MLT's must receive an associate (two-year) degree from an accredited institution including supervised clinical experience in an approved laboratory.

SALARY: Beginning salaries generally run from $600 to $750 per month.

CYTOTECHNOLOGIST

One specialty of the field of medical technology is cytotechnology--or the study of cells. After preparing and staining body cell samples, the cytotechnologist microscopically examines them to detect abnormalities which indicate cancer. Training includes recognition of minute irregularities in size, color or shape of cell nucleus and cytoplasm which is crucial in the detection of cancer in its early stage when it is curable.

EDUCATION: To become a cytotechnologist, the student must have two years of college with 12 semester hours of biology. Twelve months of study at an AMA-approved school of cytotechnology follows, the last six months of which are spent in the cytology laboratory.

SALARY: $10,000 or more per year is the usual starting salary.

HISTOLOGIC TECHNICIAN

Histotechnology is the science of human tissue. Preparing human tissue for examination by the pathologist is the job of the histologic technician. This is often done while the patient is still on the operating table. The technician flash-freezes the tissue, cuts a thin sliver with a microtome, mounts the sliver on a slide and stains it for the pathologist's inspection who then determines if the sample is malignant or benign. Manual dexterity is a must for handling the fragile glassware and instruments.

EDUCATION: High school graduation is required and a background in biology, chemistry and mathematics is helpful. One year of intensive training in a clinic or hospital pathology laboratory is also required. Also check your local hospital.

SALARY: The usual starting salary for histologic technicians is $700 to $750 per month.

For further information about these careers write to:

Registry of Medical Technologists
American Society of Clinical Pathologists
2100 W. Harrison Street
Chicago, Illinois 60612

American Society for Medical Technology
Suite 200
5555 W. Loop South
Houston, Texas 77401

Medical Technologist and Medical Laboratory Careers, HEALTH CAREERS PROGRAM, P. O. Box 4387, Madison, Wisconsin 53711.

PRACTICUM ACTIVITIES

In a medical laboratory, specimens are analyzed for hospitals and physicians in the area. In addition, such laboratories often perform forensic work for police departments (such as testing for drug usage and alcohol) as well as autopsies. Usually about a third of the employees of such a laboratory are medical technologists.

One important warning to students who will be working in a medical laboratory: Because you will be working in a sterile environment, you will have to be sure your clothes, lab coat, and hands are clean. If your hair is long, wear it tied back so that it does not fall into things. These standards are required by governmental codes and are checked regularly by agency representatives to see that they are enforced.

The book Clinical Diagnosis by Laboratory Methods by Davidsohn and Henry is a much-used reference book for most medical technologists. It would be useful for you to be able to use a copy of the book while you are at the laboratory; your supervisor may be able to provide a copy.

Since licensing requirements do not permit you to do analyses of patient specimens, any tests you are allowed to perform must be confined to reruns or to tests on your own specimens. This will not detract from the experience because running tests on your own specimens might make it more interesting.

Following is a brief explanation of some of the activities carried out in departments usually found in a medical laboratory:

Serology: blood typing, RH typing, rubella testing (a new California state law requires that all females must show evidence of this test before they can get a marriage license), syphilis testing, and the identification and quantification of protein substances.

Hematology: red and white cell counting, quantification of hemoglobin, blood smears for the identification of white cells, prothrombin timing for coagulation disorders, chemical and microscopic urinalysis.

Bacteriology: the culture and identification of microorganisms and their susceptibility to antibiotics.

Steroid and automated chemistry: the quantification of blood and urine constituents to determine abnormally high or low levels.

Electrophoresis: separation and quantification of serum protein components, the identification of enzyme factions (LDH and alkaline phosphatase).

Below are suggested activities you might perform:

1. Tour the laboratory with your activities supervisor. Find out which departments you will be able to work with and how they would like you to proceed. Note the different kinds of careers represented in the laboratory; how do the practitioners specialize? How often and under what circumstances do they come into contact with each other? How are the departments divided? Do practitioners rotate from one department to another? (2 hours)

2. Prepare a section for your journal in which you give a refined definition, when appropriate, and the procedures for testing for the following.

blood typing
RH typing
rubella
syphilis
red blood cells
white blood cells
hemoglobin
prothrombin
steroids
microorganisms
hormone
serology
hematology
bacteriology
electrophoresis
coagulation

(4 or more hours)

3. Investigate the regulatory agencies which license practitioners of medical technology. What is the justification for these agencies? What kinds of control do they exert over medical laboratories? Discuss this in a short essay in your journal. (1-2 hours)

4. Objective: Describe spectrophotometric methods of analysis as they apply to medical technology.

You may be able to run a demonstration to determine the concentration of a salt water solution. First, observe someone perform the following analysis; a quick hand method is preferable, when available.

a. Observe the technique of setting up a hand procedure.

b. Watch the development of color indicating concentration of substances.

c. Final measurement in an electrical device.

You may be able to make your own comparison test using a simple spectral curve on varying concentrations of a colored solution. Here are the steps:

a. Prepare solutions of $CuSO_4$ in varying concentrations. Plot the concentrations against optical density on graph paper.

b. Note the relationship between concentration and optical density over percent of transmission.

c. Regarding standardization, explore the basis for measuring solution (such as a patient specimen) of an unknown concentration against a standard concentration.

d. This and other tests suggested below are reviewed in Davidsohn and Henry: "Clinical Laboratory Methods." (4 hours)

(Lesson 10 from the Nutrition Unit is a good review for this activity.)

5. Physiology and pathology of the stomach/liver. Observe histo/pathological specimen preparation, ideally from the stomach or liver. Examine a normal section on a slide; then examine an infected section (ideally tissue invaded by parasite) on a slide. You should be able to set up the microscope needed and carry through a tissue section staining process. When your

examination of these slides is completed, examine similar parasites in a different medium (e.g., feces). Compare the adult worm with the larvae.

Before you start this activity, you may find it useful to refer to a discussion of the parasite you will observe in Harold W. Brown's Basic Clinical Parasitology. A copy is likely to be available in the lab. (4-6 hours)

(A review of lessons 44-50 of the Nutrition Unit would be useful.)

6. A continuation of this activity might begin with a review of the function and/or metabolism of the liver (Nutrition Unit, lessons 44-50). What liver dysfunction can be related to common use of street drugs? What toxicological effects are related? Observe (or, if possible, perform) a test for jaundice. See Davidsohn and Henry, Clinical Laboratory Diagnosis. (2-4 hours)

7. Depending on the size and scope of the laboratory, you may be able to study the effects of various factors on breathing and respiratory function. (As preparation, you will find it useful to review Respiration Unit lessons 7, 34 and 44.) If a respiratory therapy unit is available, begin by observing various patients on respiratory therapy, ideally cigarette smokers, diabetics (coma), or patients with congestion due to bacterial-related disease.

You can see the laboratory connection with these patient problems by performing any or all of these lab activities:

a. Regarding cigarette smoking-related pathology, observe histo/path specimen on a slide. Set up the microscope, make necessary arrangements, and take down the equipment when you have finished. (1 hour)

b. Regarding diabetic acidosis, determine and describe the substances which make the body pH acid. (1 hour)

c. Regarding bacterial-related disease, prepare a culture (at least by streaking plates; use more sophisticated techniques if possible). After 24° incubation, prepare a slide for microscopy from suspicious bacterial growth. Examine the slide and discuss your findings with your activities supervisor. (4-6 hours)

8. Analyze three of the careers represented in the laboratory you are working in. Find out about: educational and licensing requirements; personal qualifications desired; ten-year job outlook; typical salaries; working conditions; advancement possibilities; life-style imposed on and off the job; desirable experience; and other topics which interest you. An interesting way to approach this might be to spend time observing three practitioners (who represent three different careers) for several hours; describe in your journal their typical daily activities. Seek their opinions on the above topics by interviewing them (possibly over lunch or a coffee break). Pull your results together and prepare a section for your journal on each career. You might find some useful information in job descriptions, if they are available at the lab; ask your supervisor to help you. (4-6 hours)

9. Select two departments/stations within the laboratory. Spend a morning at each of them observing and discussing with the practitioner the tests you see performed. Whenever possible, perform the test yourself, using reusable

samples or your own specimens. Refer to Davidsohn and Henry for an introduction to the test as well as an analysis of typical results.

The Biomedical Practicum staff thank Alma Evans of San Francisco, California, for her help in developing these activities.

Biomed Practicum

Curriculum Module

MEDICAL RECORDS ADMINISTRATOR; MEDICAL RECORDS TECHNICIAN

Within a hospital there are numerous "nerve centers"--departments which perform duties affecting all hospital functions. The Nursing Station on the ward is the centralized location coordinating all activities of in-patients. Appointments is usually the first department to have contact with a patient and they start the chain of events leading to the patient's eventual admission. Housekeeping coordinates functions ranging from waxing the floor in the Employees' Lunchroom to stocking the Linen Supply Room on the wards. However, one department more than any other serves as a "central nervous system" for all patient related services--Medical Records.

The chart or medical record is *the* most important compilation of data concerning a patient. It contains *all* information regarding the patient's health care, such as: progress notes by doctors, nurses, social workers, specialists and technicians, lab reports, medical history, insurance information and records of clinic visits. As such, this is a highly confidential document. It is the function of the Medical Records Department to plan, organize and control the compilation, quantity and quality analysis of all medical records.

There is a clear hierarchical distinction between the Medical Records Technician and Administrator. The administrator could be compared to an office manager and the technician to a skilled secretary.

The Medical Record Technician analyzes medical records for completeness, consistency and compliance with requirements, and performs related functions such as coding medical record information, and selecting and compiling medical record data. Persons in this position abstract diagnostic and treatment information from the medical records; convert data collected into a form for statistical use; review abstracts for completeness, clarity and quality of content and write reports of finding.

The Medical Records Technician, as well as working directly with the medical record, spends considerable time supervising a work group of clerical employees, varying from 16 to 20 personnel. He/she trains, assigns and reviews for accuracy and conformity the work of Medical Record Clerks and assists in maintaining staffing and financial controls.

A third primary function of the Medical Record Technician is to handle outside requests pertaining to information in the medical record. This could include processing routine subpoenas for medical records and being the representative of the hospital as Custodian of Medical Records in courts of law on routine cases. He/she prepares correspondence requiring the application of

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highly specialized medical and medicolegal knowledge and discrimination in the selection of data or interpretation of laws, rules, or policies and the resolution of debatable points where a mistake in judgement may entail serious consequences.

The Medical Records Administrator position involves department management, statistical reporting, interfacility consultation and other special projects. He or she establishes policies and procedures for operation of the Medical Records Section to cover record content, abstract statistical data, record availability, confidentiality and release of information.

The Medical Records Administrator defines, correlates, interprets and projects statistical data for administrative use in administrative and budgetary planning and control. As the department leader, the Medical Records Administrator is the key liaison person with other in-hospital departments and outside agencies and individuals. He or she participates in coordination and standardization of record content, flow and control within the various record specialties (such as medical, alcoholic, psychiatric and narcotic) and through the various facilities (such as hospitals, hospital-based clinics, day care programs, laboratories and registries).

KNOWLEDGE REQUIREMENTS: Both of these positions--Medical Records Administrator and Medical Records Technician--require basic knowledge of medical terminology and human anatomy; classification of morbidity and mortality information for statistical purposes.

In addition, the Medical Records Administrator must possess a detailed knowledge of the various record systems used by health facilities; diagnostic techniques and modes of therapy as well as gross anatomy and medical terminology and an understanding of the principles of effective supervision and maintenance of good public relations.

ABILITY REQUIREMENTS: Both the Technician and Administrator require ability to understand and conform to specific basic principles and rules of health data abstracting and coding. Because they are in contact with the public regarding highly confidential information, persons in these positions must deal tactfully and communicate effectively with the public. As in most medical related fields, academic and in-service training are required on a periodic basis to keep abreast of new developments and persons in these positions should benefit from these experiences as they come up.

The Medical Records Administrator must have the ability to analyze situations accurately and take effective action. The ability to plan, organize, train and direct the activities of a staff of Medical Record Technicians is imperative in this managerial position.

EDUCATION--MEDICAL RECORDS TECHNICIAN: Graduation from high school (additional qualifying experience may be substituted for the required education on a year-to-year basis). Certification: Certification by American Medical Record Association as an Accredited Record Technician.

OR

Eligibility to take accreditation examination for Accredited Record Technician given by the American Medical Record Association (entry to this exam is by successful completion of AMRA correspondence course for Accredited Record Technicians or graduation from AMRA approved school for Medical Record Technicians).

EDUCATION--MEDICAL RECORDS ADMINISTRATOR: At least four years of study after high school is required to become a professional registered medical records administrator, and four-year undergraduate programs in medical record administration are most common. Approved schools for medical record administrators are either 12-month hospital certificate schools which admit students with a bachelor's degree or four-year programs in accredited colleges and universities which grant a bachelor's degree in medical record administration. Upon completion of the professional program in an approved school, the graduate is eligible to take the Registration Examination for the designation "RRA"--Registered Record Administrator.*

For additional information, write:

American Medical Record Association
John Hancock Center--Suite 1850
875 North Michigan Avenue
Chicago, Illinois 60611

SALARIES: Medical Records Technicians in California usually earn $680 to $830 per month. Medical Records Administrators begin at about $780 and may advance to $1000 or more per month.

PRACTICUM ACTIVITIES

1. It's a good idea to begin your exploration of the MR Dept. by taking a tour of the hospital. This will be more meaningful if it is preceded by an explanation of hospital organization. Look at the MR Dept. organization chart so that you understand staff interactions and individual functions. From these observations, determine staffing levels and calculate staffing need. (E.g., like so many other areas in the hospital, the MR Dept. may be understaffed. Take this into consideration.)

2. Medical records or patient charts can be very bulky. Space and the organization of space are key factors in the effectiveness of the MR Dept. Calculate the available square footage and the space needs per worker. From this information, propose a plan for the best utilization of space. (3 hrs.)

3. Gather data on the quantity of work per employee. A calculation could then be made concerning the mean, median and average production rates. (2 hrs.)

4. Prepare a simplistic workflow chart. (3 hrs.)

5. Score tests such as typing and card filing. (1 hr.)

6. Review past budget material and from this information, project future budgetary needs and calculate percentages for salary, equipment, etc. (2 hrs.)

7. Accumulate comparative data and predict trends for various workloads. For instance, there is a big correspondence workload. This involves communica-

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*Adapted from Health Careers Facts, Health Careers Program, P. O. Box 4387, Madison, Wisconsin 53711.

tion with welfare agencies, insurance companies, other hospitals and other doctors. There may be as many as 300 requests per month. Compare quantity of work performed to the work standard set, and calculate the increase needed to meet the standard. (1 hr.)

8. Evaluate source and accuracy of composite daily census report (patient head count per floor). (1 hr.)

9. Combine daily census to formulate a composite census report. (1 hr.)

10. You should become acquainted with patient movement terminology such as Admission, Discharge, In/Out Patient, Outpatient and Emergency Patient. Comparative statistics prepared from this information may lead to staffing changes. This would be a good way of finding out most of the activities going on in the hospital. (2 hrs.)

11. You will become acquainted with disease classifications. Prepare data stating the average length of stay for several of them (e.g., the average length of stay for a cholostomy versus a pneumonia patient). Make a comparative analysis from this data. (3 hrs.)

Any good text on data processing will be helpful to an understanding and the fulfillment of the following activities:

12. Become familiar with the data processed report content of MR Dept. such as the computer printouts dealing with patient listings. (1/2 hr.)

13. Observe trends in computer produced data and make forecasts regarding those trends. (1-1/2 hr.)

14. Become familiar with the application of computer terminals and their use in obtaining statistics stored in the data bank. (1/2 hr.)

15. Chart processing involves the abstraction of information onto data-processing coding documents. This abstraction includes coding of diseases and operations. Prepare two abstracts (1-1/2 hr.) and code simple diagnoses (2 hrs.) Note the required indexes such as disease, operation, physicians, death, infections, complications, source. Such an abstraction is used for research, planning and to meet requirements (e.g., the AMA may review a particular program such as Internal Medicine by asking for five pneumonia cases).

16. Prepare photocopies from patients' charts. Become familiar with "pertinent" and "non-pertinent" types of medical information necessary for filing requests.

17. Review information for the completion of insurance forms; correspondence log; subpoena (duces tecum = to take record); subpoena deposition for a medical record. (1 hr.)

18. Review state and county regulations on registration of births, deaths, fetal deaths, natural miscarriages, etc. (There are different regulations for deaths in different age groups.) (1/4 hr.)

19. Abstract data for therapeutic abortion report form. Special reporting forms are used (dates of last menses, demographic information, residency, complications, type of therapeutic used). (1/2 hr.)

The Biomed Practicum staff thank Lydia Daniels of Highland Hospital, Oakland, CA, for the many hours she spent helping to develop this module.

Biomed Practicum

Curriculum Module

MEDICAL SOCIAL WORKER

Illness and injury are frequently accompanied by surrounding difficulties that serve to dampen a patient's outlook and impair his recovery. "How will I meet the expenses?" "What about my job?" "Who will care for the children?" Each represents a practical, pressing problem that clouds the general attitude of the patient and prolongs convalescence. Just as a professional medical team is necessary for physical recovery, professional social services are needed to relieve a patient of these disrupting personal problems.

The patients who make the best response to medical treatment are usually the ones who can release themselves from surrounding tensions. The health team requires the services of qualified medical social workers who provide ease of mind by relaxing or curing a patient's social, occupational, family or financial problems. The medical social worker is skilled in applying professional knowledge to the complex situations people encounter when illness strikes. The social worker can help people make the most of family stability and strength, and can also help them with problems when a solution to these difficulties is an integral part of recovery.

The services of the medical social worker become a valuable part of the patient's total treatment. He or she is directly involved in shaping the patient's personal outlook--an outlook that must be characterized by confidence of recovery and confidence of resuming a productive life. Particular stress is placed on the needs and the related problems that are associated with illness and disability. The social workers know that everyone reacts to trouble in his own way. Some people withdraw, some become defiant, some bluster, and some become easily irritated. The medical social worker must be capable and anxious to help these types in spite of their individual temperaments.

The responsibilities of the medical social worker may be as varied as the people served. Execution of duties requires tact and talent in human relations, professional skill, and judgment. The medical social worker must be a competent counselor, willing to listen to the problems of others and capable of finding solutions to their difficulties. Along with an understanding of human nature, the social worker must possess a thorough knowledge of all the community resources that can be tapped to assist the troubled individual and his/her family.

A working relationship must be maintained with employment counselors, patient services, legal advisors, tutorial services, and other service organizations that may be helpful. There is no basic formula that will offer relief to the personal problems of the patient.

In seeking solutions to the difficulties of the patient, the medical social worker performs an important function within the realm of the health team. Although duties are not confined to a hospital or clinic, the medical social

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worker collaborates with the physician in helping to reconstruct a patient's confidence and in keeping him on the path to recovery.

PERSONAL QUALIFICATIONS: The successful medical social worker needs a special combination of personal qualities. Objective good judgment--the ability to examine all sides of human problems--is as important as establishing a basic rapport with the patient. He or she must possess the ability to recognize human problems and the skill to apply professional knowledge and training in finding sources that will alleviate them.

EDUCATION: The practice of medical social work requires extensive professional preparation. A background in psychology or sociology should be a part of the medical social worker's undergraduate training. A major in social work is also helpful. In addition to a bachelor's degree from an accredited college or university, two years of graduate school at an accredited school of social work is required for most positions. Bachelor's degree programs are available at many California universities. A master's degree program is offered at Stanford University; California State University, Fresno, Sacramento, San Francisco, and San Diego; University of California, Berkeley and Los Angeles; and University of Southern California.

Graduate education should provide the student with a background in major diseases, personality growth and development, and behavioral disturbances of adults and children. Through schooling and practical experience the medical social worker should become familiar with health and welfare services in the community.

OPPORTUNITIES: Medical social workers are employed in hospitals, clinics, public and private health centers. Their services are also needed in local, state, and federal public health departments. Military and veterans hospitals also have a chronic need for qualified social workers. Social workers employed in any setting deal with the physical and emotional aspects of their client's problems.

The medical social worker may exercise an option of seeking employment in a medical center or in concentrating efforts on a specialized field. In this area one may work exclusively with a particular ailment or age group. Crippled children, the blind, patients with tuberculosis, heart disease, or cancer each require special encouragement and practical assistance to help them resume satisfying lives.

Experienced medical social workers also teach in colleges and universities, or enter into fields of public health or social work.

SALARIES: Medical social workers are paid salaries comparable to other professional personnel. Average annual salary ranges between $8,000 and $14,000 depending upon training and experience. Current demand for qualified medical social workers makes opportunities for advancement excellent.

MORE INFORMATION: For additional information about career opportunities in medical social work, write to: National Association of Social Workers (Medical Social Work Section), 2 Park Avenue, New York, New York 10017.*

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*The above information was taken from Health Career Facts, Health Careers Program, P. O. Box 4387, Madison, Wisconsin 53711.

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PRACTICUM ACTIVITIES

Medical social work is a difficult career for an observer to understand. Consequently, the medical social worker who helped to develop this module recommends that the high school student and the social worker hold as many discussions and questions-and-answer sessions as possible about each activity/procedure the student becomes involved in. She also suggested that the medical social worker suggest background reading for the student or, when possible, loan the student books and articles to read over.

Below are some possible activities for various programs with which a medical social worker may be involved.

1. If you have access to a drug and/or alcohol abuse facility, the following activities would give you a good introduction to medical social work in that area.

a. Observe a professional interviewing a drug user or alcoholic. What kinds of information is needed? How does the drug user/alcoholic react to the interview? Is he/she reluctant to provide some information? How will the information be used by the hospital or clinic? What are your reactions to the drug user/alcoholic? (2-3 hrs.)

b. Observe the treatment by hospital staff of a hospitalized drug user. Do staff seem prejudiced against drug users? Do they give them special or preferential treatment? Do hospital staff have a good understanding of the problems and needs of a drug user? Do physicians react differently than other hospital staff? (2-3 hrs.)

c. Observe the role of the alcoholic's spouse. What special difficulties does the spouse encounter? What help is the spouse expected to give to the alcoholic? An old cliché says that a man's wife can drive him to drink; do you see any situations in which you think this is proved out? Is the reverse true when a woman is the alcoholic? (1-2 hrs.)

d. Interview the physician who is treating a drug user. Ask him/her about:

(1) administration of medicine which has become addicting for the patient.

(2) laws concerning drug abuse.

(3) successful treatment of drug users.

(4) diseases which are common to addicts and their offspring. (1/2 hr.)

e. Become aware of and evaluate at least one resource for alcoholics and drug users. Examples are: Alcoholics Anonymous, Synanon. (2-4 hrs.)

f. Review in depth the life history of one current drug and/or alcohol user. Research the contributing factors. Summarize your findings in your journal. (2 hrs.)

2. An emergency or outpatient clinic waiting room is another place the medical social worker is needed. Some possible activities are:

a. Observe and discuss with your supervisor cultural differences in the definitions and treatment of illness. (continuing)

b. Investigate the history of an illness and determine what social factors contribute to the extent and treatment of the illness. (2 hrs.)

c. Investigate reasons given by patients for missing follow-up appointments in the outpatient clinic. (continuing)

3. If your medical social worker placement is in a hospital, you might:

a. Become aware of medical eligibility requirements. Medicare and Medi-Cal are accused by some users as being designed for people who hit "rock bottom" with an illness. This seems contrary to the emerging concept of preventive medicine. Is there, in fact, a severe disagreement between the concept of preventive medicine and the theory behind Medicare and Medi-Cal eligibility? (1-2 hrs.)

b. Interview the nursing staff as to the qualities of a good patient. Compare the results with the Patient's Bill of Rights you were given during the Practicum Orientation. Do you find any differences between the "good patient" concept and the Patient's Bill of Rights? (1/2-1 hr.)

c. Investigate patients who check out against medical advice (AMA). What reasons do they give? If possible, interview such a patient. Do you believe the medical social worker could do anything which would discourage the patient from checking out AMA? Are such patients sometimes restrained by force? What is your evaluation of such situations? Who should have the final say, the patient or the medical team? (1-3 hrs.)

d. Track a psychiatric patient. Ask the staff to point out abnormal behavior and discuss cultural and societal influence. If possible, obtain permission from the staff and from the patient to spend some time with the patient. How did you react emotionally to the illness? Did you feel awkward talking with a patient whom you know is mentally ill? Discuss your reactions in your journal. (2-3 hrs.)

e. Make a study of patients in the cardiac care unit over the entire week. What occupation, sex, culture, and income strata are most often represented? What help do such patients need from the medical social worker? (continuing)

4. If you and the social worker interact with the transplant and/or dialysis patients, you may be able to carry out these activities:

a. Track a patient who is applying for Medi-Cal; define the requirements and dehumanizing components of Medi-Cal. (1-2 hrs.)

b. How does the stress of this type of illness affect patients of different economic levels? (1/2 hr.)

c. Unfortunately, there are more patients who require transplants/dialysis than there are donors or facilities available. Consequently, someone has to decide which patients should receive the transplant/dialysis. How are such decisions made? If allowed, retrace the reasons/criteria behind several decisions. How do you react to the decision? What about the patients who are not chosen? (1-3 hrs.)

d. Follow a patient for dialysis/transplant from admission to treatment and, if appropriate, to discharge. Consider the continuity of care for this patient, the treatment of the patient in the facility, the communication between the patient and the staff, patient interaction with the staff, and the assistance given the patient upon his/her discharge to give the patient the best environment to make the medical treatment effective. (continuing)

e. Research the location of dialysis centers in the state of California. Which members of the California population are not getting served by these centers? What happens if a patient living in Eureka needs dialysis? (1/2-1 hr.)

5. Describe yourself at six years, twelve years, and present, noting emotional and physical differences in yourself. What changes do you think will take place by age 25? Age 50? Age 65? (1-2 hrs.)

6. If you have a chance to spend time in a crisis-intervention center or 24-hour hotline or suicide prevention center, you might determine what problems are brought to the center's attention and how they are handled. What are the qualifications of the people at the center? How important do you think these jobs are to the community? Should such centers be financed by the public rather than by donations as most of them are now? (2-4 hrs.)

7. You may wish to pursue some additional activities on your own, possibly in the afternoon or evening. Here are some suggestions:

a. Interview at least six citizens (perhaps in your neighborhood) about their feelings about the mentally ill being housed and treated in the community instead of in restricted, special mental institutions. Try to choose citizens to interview who are of different sexes, ages, and races. (4-8 hrs.)

b. Interview a nursing home patient and become familiar with at least one nursing home program. How does an older person in a nursing home adjust to old age? To being in a nursing home? Who pays the costs of a patient in a nursing home? (2 hrs.)

8. If it is possible for you to visit a genetic counseling department, you may be able to observe the interview of a couple asking for consultation concerning the physical or mental condition of their offspring. Here are some possibilities:

a. Interview a geneticist about his/her feelings about reproduction between mentally retarded adults, Huntington's chorea patients, and in cases where one potential parent is Rh negative and one is Rh positive. (1/2-1 hr.)

b. What things should a couple consider in regard to their ability to conceive and rear children? (1-2 hrs.)

c. What counseling is given to a couple who have had a child with SIDS (Sudden Infant Death Syndrome)? (1/2 hr.)

9. Review the health programs of the Kennedy and Nixon administrations. Compare them. Do these two administrations reflect different viewpoints about health care? What are these different viewpoints. (3-5 hrs.)

10. What is Health Maintenance Organization? Is it the solution to health care needs of all citizens? (1-2 hrs.)

The Biomedical Practicum staff thank Ms. Julie Ball of San Francisco, California, for her help in developing the activities in this module.

Biomed Practicum

Curriculum Module

NURSING; SUPPORTIVE NURSING CAREERS

Nursing. The initials "R.N." and "L.P.N." or (L.V.N) mean to the world that you are in one of the most challenging, respected, exciting, and dynamic service professions or occupations. The "R.N." is the registered nurse; the "L.P.N." is the licensed practical nurse ("L.V.N." - licensed vocational nurse - is equivalent to L.P.N.).

The registered nurse who has an associate degree or diploma in nursing is employed generally in hospitals, physicians' offices, home care programs, clinics, military service, and as a private duty nurse. In addition to the foregoing, the nurse with a baccalaureate degree may be employed as a public health nurse, school nurse, or an occupational health nurse. The nurse who has a master's or doctoral degree may qualify for nursing positions as a teacher, clinical specialist, supervisor, administrator, consultant, or in research.

The licensed practical nurse is employed in hospitals, physicians' offices, home care programs, and clinics. He/she may give practical nursing care to a certain kind of individual patient in his home or at the hospital.

Personal Qualifications for Nursing. A person interested in nursing should enjoy being around people, possess a strong motivation to help others, be eager to learn and have good study habits. Other important attributes are integrity, dependability, respect for others, a sense of humor and good physical and mental health.

Applicants for all nursing programs must be at least 17 years of age, but there is really no age maximum. Marital status, race and sex are not determinants for admission. A student must meet certain admission requirements of intellectual ability, previous education, and other factors designated by the school. Any person considering nursing should be willing to spend from one to four years in preparation for this career.

Financial Assistance. Scholarships, grants and loans are available in all four types of schools on the basis of merit and need. There are many sources of help from the state and federal government, service clubs, foundations and the schools. Financial aid is available to enable the student to enroll in the type of program for which he is best suited.

Details concerning financial aid and the conditions under which it may be secured may be found in the catalog of schools and through conferences with school counselors.

Nursing Salaries. Salaries and fringe benefits in nursing vary considerably, depending on factors such as type of position, educational preparation, experience, size of institution or agency, and geographic location. Beginning salaries for new graduate nurses begin around $900 per month. Licensed practical nurse graduates usually begin employment at salaries between $700 and $800 per month.

Field test version: 6/27/74

ASSOCIATE DEGREE NURSE

DUTIES

Organizes, implements, and evaluates a plan of nursing to meet the immediate needs of one or more patients in hospitals, nursing homes, and clinics.

Performs technical nursing functions under supervision which are appropriate for his/her education and background in the bio-physical and social sciences.

Shares responsibility for patient care with other members of the nursing and health team.

Interprets and demonstrates nursing care to patients and families.

EDUCATION

Technical school or junior college.

2 academic years plus a summer session.

Program combines general and nursing education. Selected laboratory practice with patients is included in nursing courses.

Graduate of accredited program is eligible for examination for State licensure as registered nurse.

LICENSED PRACTICAL NURSE

DUTIES

Assists the registered nurse in giving complex nursing care to patients in all age groups who are acutely ill.

Here he/she contributes a part of the nursing care; the major responsibility is carried by the professional nurse.

Serves as a member of a nursing team under the supervision of the registered nurse in giving direct nursing care to infants, children, and adults who need skilled but uncomplicated care.

Shares responsibility for patient care with other members of the health team.

EDUCATION

Vocational or private school.

1 year.

Program includes classroom instruction and selected laboratory practice with patients.

Graduate of accredited program is eligible for examination for State licensure as licensed practical nurse.

BACCALAUREATE DEGREE NURSE

DUTIES

Plans, directs, and evaluates nursing care to meet immediate and long range needs of one or more patients in hospitals, nursing homes, and clinics.

Gives nursing care and performs complex nursing functions appropriate for his/her education and background in the bio-physical and behavioral sciences.

Plans for the care of patients with other members of the health team; may be a leader of the nursing team and a coordinator of patient care.

Teaches and demonstrates nursing care to patients, families and members of the nursing team.

Provides health services to people in the community as a public health nurse.

May advance to positions such as that of head nurse.

Qualifies for graduate study.

EDUCATION

University or college, usually four years.

Program includes general and nursing education. Laboratory practice in nursing care of patients in hospitals and public health agencies is offered after the first year.

Graduate of accredited program is eligible for examination for state licensure as registered nurse.

Ready for graduate study in nursing.

DIPLOMA NURSE

DUTIES

Organizes, implements, and evaluates a plan of nursing care to meet the immediate needs of one or more patients in hospitals, nursing homes, and clinics.

Performs nursing functions which are appropriate for his/her education and background in the biophysical and social sciences.

Plans for the care of patients with other members of the health team; may be a leader of the nursing team and a coordinator of patient care.

Interprets and demonstrates nursing care to patients, families, and members of the nursing team.

EDUCATION

Hospital school of nursing.

3 years (about 32 months).

Local college or university usually provides basic courses in the sciences. Instruction and laboratory practice focus on nursing care of patients.

Graduate of accredited program is eligible for examination for State licensure as registered nurse.

For information about schools and hospitals which offer nursing programs in California write to the California League for Nursing, Inc., P.O. Box 976, Petaluma, CA 94952.

Supportive Nursing Careers. Nursing assistants, orderlies and ward clerks compose a large group of nursing personnel who are supportive to the professional nurse. They perform selected tasks in patient care or related duties which supplement the work of the professional staff to keep the hospital or health care facility operating smoothly and efficiently.

These positions require a minimum of specialized training. For the person considering a career in the health field and wishing to gain some experience in a health care facility, each of these three positions offers this chance. Fringe benefits derived from positions which are supportive to nursing include orientation to hospital procedures and a rewarding experience in helping people.

The duties of a nursing assistant vary from institution to institution. Working under the direction of professional nurses, assistants may make beds, bathe patients, assist in feeding patients, deliver messages, escort patients to other departments, and distribute and collect food trays. In short, nursing assistants may perform many tasks which contribute to the personal comfort and care of the patient.

Personal qualifications for nursing assistants are an interest in people, willingness to be of service, and tolerance for working with people who are ill. A keen sense of responsibility and a respect for details are also important. The nursing assistant must also be tactful and discreet and treat all patient information as confidential.

Nursing assistants may be trained in one of two ways. On-the-job training offered by the health care facility in which employment will be found is one method of securing training. These programs may extend over a three-month period. The person may also register for a pre-service nursing assistant course offered at a community college. These programs may extend over a three-month period. The person may also register for a pre-service nursing assistant course offered at a community college. These courses are approximately 180 hours in length or six weeks.

A high school diploma is preferred but not required for employment as a nursing assistant or for entrance into the training program.

The orderly is usually a male employee who performs tasks similar to the nursing assistant. His duties may vary from one institution to another, however, he usually performs tasks for male patients or he may be assigned to heavier work in the nursing unit. In some instances, he may carry more responsibility than the nursing assistant.

The ward clerk is also known as a floor or station clerk and a ward or unit secretary. He or she is also under the supervision of the head nurse while relieving the nursing staff of much of the clerical work. As a receptionist, the ward clerk directs visitors to patient rooms and takes and relays telephone messages. The ward clerk may prepare patient charts and distribute them to doctors as they make rounds. Recordkeeping and reportmaking may also be among his duties, so good spelling ability and mathematical ability will be assets. The ward clerk must have a pleasant personality and a gracious manner since he is constantly working with people.

A high school diploma is necessary with credits in typing and business desirable. Hospitals will hire ward clerks without post high school education and provide on-the-job training. Community colleges often offer specialized training programs to sharpen the skills ward clerks need in order to function effectively in the nursing unit.

Salaries for nursing assistants, orderlies and ward clerks are comparable to similar positions in the community requiring the same amount of education and having the same amount of responsibility.

For further information, contact your local hospital or other nearby health care facility.*

PRACTICUM ACTIVITIES

1. Begin your placement activities by going on a tour with your activities supervisor (or with someone else designated by your supervisor). In addition to learning your way around the facility, find out how the various departments work together, how members from each department form different kinds of medical teams, and also find out which departments you may and may not be admitted to. After your tour of the facility is over, take a tour of the department or section in which you will be working. Ask your supervisor to designate an alternate supervisor to help you when your regular supervisor is too busy to work with you. (1-2 hours)

2. It is a good idea to review this module with your supervisor before beginning any activities. This will give the two of you an opportunity to plan out several days' activities--or maybe the whole week's, if time permits. It is recommended that the activities planned include supervised activities as well as unsupervised activities which the student can carry out alone when the supervisor is unavailable for some reason. Such unsupervised activities may include interviewing patients, reading background materials provided by the supervisor or available in the library of the facility, working with other staff members (such as orderlies, ward clerks, and other), and similar activities. (½ to 1 hour)

3. Paperwork is a little-loved but necessary part of each hospital, clinic, or other health facility. Paperwork usually precedes a patient to a ward. What kind of paperwork is used for this purpose? How do the nurses and other ward staff use this paperwork (for example, patient charts, doctors' orders)? Where is the patient information filed? Who has access to it? Can you, as a student, read over patient records in this particular facility?

Find out what the regulations are for the facility and ward you are in. If possible, get a copy for your journal. After you have had three or four placements, you might find it interesting to compare the regulations and look for differences and similarities among several facilities and/or departments. (2 hours)

4. Patient education is a major part of many hospital's activities. If there is a patient education department in the facility you are in, sample some of the classes and training sessions that are offered. An example would be diabetic education. In such classes, patients are usually given a definition of diabetes, information about implications for their daily living, techniques of insulin injection, meal planning, diet selection when eating out, among other topics. You might attend such a session, pretending that you yourself are a patient who has recently found out he/she is a diabetic. Participate in menu planning, urine testing, and other activities.

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*Above descriptions taken from Health Career Facts, HEALTH CAREERS PROGRAM, P.O. Box 4387, Madison, Wisconsin 53711.

Some questions you might answer as part of this activity: What is diabetes? What information do diabetics need to have in order to take proper care of themselves? What information do diabetics' friends and families need in order to help the diabetic? Are there special exercise requirements for diabetics? Can a professional athlete, such as a football player, be a diabetic and still participate as fully as a "normal" player? Do diabetics need to make special arrangements when they travel? Why do so many obese, older patients become diabetic? How would you educate such people to take care of themselves? Can such diabetes be "cured"? Devote several pages in your journal to answering these questions.

If the patient-education sessions you attend do not happen to be on the topic of diabetes, adapt the above questions to suit your situation. Your supervisor may be able to provide or suggest important reference materials for you to look over. (4-10 hours)

5. R.N. and L.V.N. or L.P.N. are terms you will hear often in a hospital. What differences, if any are there between the education and the jobs of these two kinds of nurses? P.H.N.--what do the initials stand for? Make a study of the tasks of the different kinds of nurses you come into contact with. Is there a difference in the degree of responsibility these nurses have? Are chances for promotion better for RN's than for other nurses? Can any nurse become a head nurse? Can any nurse become a surgical nurse? An orthopedic nurse? Can any nurse teach patient education seminars? Can any nurse work with children?

6. With your supervisor's permission, select several patients to interview. Find out how the patient came to the hospital or clinic; trace the steps the patient followed from the beginning of the illness to the present time. Do you find consistencies among patients? Are the steps different in an accident than in an illness such as pneumonia? Are they different when surgery is required than when it is not? (2-6 hours)

7. Explore four of the careers you see on the ward or clinic department you are in. Examples might be: orderly, ward clerk, nursing attendant, and head nurse. Compare amount of responsibility, degree/and type of patient contact, position in the team, working conditions and schedule, psychological rewards, typical salary, advancement possibilities, and other things which interest you. Evaluate each of these careers to find whether they are right for you. Write a section for your journal on each career you explore; describe your feelings about possibly choosing that career for yourself. (4-10 hours)

8. Follow a nurse for an entire morning (follow your supervisor, if possible, or else someone she/he designates). Keep a schedule of the nurse's activities, allotting the amount of time spent in each activity. For example:

a. Meeting with Dr. Smith about new patient who was admitted last night. (Purpose: report on how patient spent the night; review special procedures Dr. Smith has required for the patient.)	15 minutes
b. Training new nursing attendant in giving alcohol baths.	25 minutes

At the end of the morning, look back over your notes and group activities which are alike, such as meetings with four doctors at four different times during the morning. Compute total time spent, such as 65 minutes. Next, figure the percentage of the nurse's time spent in each activity, such as: conferences with physicians, 23%. Go over your figures with your supervisor; discuss whether this morning was typical or unusual in some respect. (4-5 hours)

9. Explore the job of the ward clerk. This person is a vital link in the medical team, an employee who interacts with almost all other members of the team. Under the supervision of the registered nurse on the floor, you may be able to:

a. Answer patient call lights and relay messages.

b. Answer the phone, stating the floor, ward or node, and "(your name), Biomed student, speaking." Relay messages to the R.N. Never accept telephone orders from the doctors or anyone else.

c. Run errands off the floor, when you are asked. You may be asked to go to X-ray, Lab, C.P.D., linen room, kitchen, and other areas. Sometimes you may be asked to bring back needed equipment.

d. Help the ward/node staff put away floor supplies, restock chart forms, and, when needed, act as a messenger for supplies.

e. Take specimens to the lab.

f. Transport patients via wheelchair or ambulatory to hospital departments (patient must be in wheelchair or ambulatory before you start; you may not prepare patients for the trip yourself). Students may not transport patients in a guerney.

g. Assist the staff with passing out nourishments.

h. Feed normal patients who need help cutting food or eating. (For example, orthopedic or eye patients who have no difficulty swallowing; you may not help patients with strokes or similar problems.)

i. Assist in passing out diet trays.

j. Assist with filling and passing out water pitchers.

k. Assist clerks with paper work, as requested.

l. Pass out mail; make "rounds" of patients to obtain gift shop items, place phone calls, write letters, read, arrange plants and flowers.

m. Discharge patients who can walk or who are already in a wheelchair.

Each day, describe in your journal how you felt about these experiences and what you learned about hospitals, nurses, patients, yourself, and others you came into contact with. (4-16 hours)

The Biomed Practicum staff wish to thank Ms. Marianna Pieck of Presbyterian Hospital, San Francisco, California, for her help in developing the above activities.

Biomed Practicum

Curriculum Module

CAREERS IN OPHTHALMOLOGY

OPHTHALMOLOGIST, OPHTHALMIC PATHOLOGIST, OPHTHALMIC PHOTOGRAPHER

OPHTHALMIC ASSISTANT

OPHTHALMOLOGIST: An ophthalmologist is a physician concerned with pathology of the eye. He or she treats occular diseases, visual problems; performs occular surgery; provides health care maintenance regarding glaucoma, cataract, low vision, retinal detachment, etc. In short, the ophthalmologist treats all occular pathology. He or she is qualified to fit glasses and contacts, but usually prefers not to.* Frequently he/she plays an educational role in the community. Any other functions performed in this position are determined by the chosen specialty and the geographic setting. For example, a small-town ophthalmologist will probably fit contacts, glasses, and an ophthalmologist in a large city will have the opportunity to become highly specialized.

EDUCATION: 4 years premed and 4 years med school followed by a 1-year internship which is a practical application of academic knowledge geared towards the development of interpersonal, coping skills. At this point, the students should have a clearer idea of what specialty he/she wants to pursue. This specialty is chosen and developed during 3 years of residency. During this time there are some educational requirements but the primary concentration is on diagnosis and surgery.

SALARY: This would depend upon specialty and geographic location, but would be comparable to a physician's salary.

OPHTHALMIC PATHOLOGIST: The ophthalmic pathologist is a physician who, after completing medical school and an internship, usually does a 3-year surgical residency followed by a 1-year fellowship in ophthalmology. Other educational requirements and salary are similar to that of the ophthalmologist.

OPHTHALMIC PHOTOGRAPHER: At present, there is no specific training for an ophthalmic photographer. Ideally a person interested in this career should have formal or informal background in medicine. An AA degree or comparable professional training in photography is essential. Salary is contingent upon training, but an ophthalmic photographer earns approximately $800 to $1,500 per month.

OPHTHALMIC ASSISTANT: Ophthalmic assistants are not licensed and therefore a physician assumes all responsibility for their work. The assistant does preliminary exam work such as visual acuity, color vision, and perhaps refraction. He or she can do visual fields, tenometries, and supplemental tests to aid the physician in diagnosis. Some states do have training programs, although there are none now in California. Presbyterian/PMC in San Francisco may have a program in 5 years. A lab tech background or paramedical on-the-job training for a 9-18 month period are possible avenues leading to this career. Many receive military training. Salaries run about $600 to $800 per month.

Field test version: 7/10/74

PRACTICUM ACTIVITIES

Ophthalmologists often work in private practice, clinics, and combination clinic/research facilities. Ophthalmic assistants work in all three types of sites, but ophthalmic photographers most often work in clinics and research facilities. Ophthalmologists in private practice usually send their patients to a clinic-based ophthalmic photographer when photographs are needed.

Because of the different kinds of office these practitioners work in, the practicum activities are divided into two areas: (a) activities relevant to private practice and clinic settings and (b) activities relevant to a research setting.

PRIVATE PRACTICE, CLINIC ACTIVITIES:

1. It is always interesting to begin the activities with a tour of the office or clinic. In addition to meeting the staff, you will be able to find out the layout of the facility, the departments involved, and the relationship of the office or clinic to a larger organization (when appropriate). Find out which departments you will be involved with and which ones you will not be able to observe or work in. (1 hr.)

2. Total patient care is a major concern in ophthalmology. Total care has two major parts: clinical care and administrative needs and requirements. The administrative side of patient care is the nucleus of the office; it will be an important side of many of your activities. With that in mind, find out what is involved in the administrative side of patient care. Spend a few hours learning: (a) how appointments are made; (b) how referrals are handled; (c) what types of appointments there are; (d) what information is required from the patient; (e) what general information is given to the patient; (f) what legalities, if any, are involved in patient care; (g) what administrative procedures come into play when surgery is involved; and (h) how and why records are kept. At this point, explore these areas generally, perhaps observing the different procedures (if possible) and participating whenever possible, as your supervisor allows. Some possible activities are:

a. Watch patient information being taken; then fill out forms and be interviewed as if you were an incoming patient. It may be possible for you to interview/collect patient histories on incoming patients, depending on the regulations and needs of the office you are in. (2 hrs.)

b. If within the regulations of the office you are in, read over several patient charts. If not allowed, ask someone to summarize the charts for you. Get a good idea of the kind and amount of information taken and how it is used in the office/clinic. (2 hrs.)

c. Observe several new patients; keep track of the kind of information given to them. Classify this information into useful categories. For example:

(1) Educational (information about diseases, exams)
(2) Directions
(3) Related to patient care (such as steps to follow; special drugs, diets)
(4) Introductions to staff
(5) Future appointments needed, etc.

Find whether there is general information which is given to all of the patients you observe, special information for certain kinds of patients, and so forth. Who gives the information to the patient? (2 hrs.)

d. Find out which laws, if any, govern patient care. If possible, read over these laws. Do more laws pertain to patients or to staff? (1-2 hrs.)

e. Eye care is expensive. Who pays these costs? Do Medicare and Medi-Cal cover eye care? Under what conditions? What other agencies help needy or aged patients pay for eye care? What are the costs of eye care? Do costs differ according to the patient's ability to pay? (6 or more hours)

f. How are records kept? What information do patient records contain? Why are records kept? Who uses this information? (1-2 hrs.)

3. Clinical care is a side of ophthalmology many of us are familiar with. Some possible activities in clinical care are:

a. What types of clinics are there? What is the reason for different types of clinics? Will the type of eye care available vary according to geographic area in the U.S.?

b. Follow a patient from beginning to end of appointment. Find out how the appointment was made and what will be involved. Read over the patient's chart or, if this is not allowed, ask someone to summarize it for you. Develop a good understanding of the patient's problem before the appointment. Watch the patient check in and then be prepared for the tests/treatment. Keep careful notes on what you observe as the patient is being tested or treated. Last, accompany the patient as he or she checks out. Is another appointment necessary? Why? What payment arrangements are made? Write an account for your journal about what you saw and learned. Talk over your reactions and questions with your supervisor. Track other patients, preferably ones with different problems. (4 or more hours.)

c. What happens if surgery is involved? How are arrangments made? What preparation is necessary? Where is the surgery performed? Who does it? What are typical pathologies which are treated by surgery? Describe the recovery needs/rates of patients who undergo different types of occular surgery. (1-2 hrs.)

d. What does an examination consist of? Are the same procedures followed for every patient? Based on the examinations of the patients you tracked, describe typical examinations. What part of the examination is performed by the ophthalmologist? The ophthalmic assistant? The ophthalmic photographer? How much time is needed for an examination? (2-4 hrs.)

4. Make a study of the personnel involved in eye care. What personnel are in the eye clinic/office you are in? What are their functions? How do their jobs relate to each other? What education and personal qualifications does each staff member have? What licenses are required? What are typical salary ranges for the clinic/office you are in? Describe working conditions, employee benefits, and opportunities for advancement in the clinic/office. What is most desirable about each of these jobs? What is least desirable? Analyze each job as a future one for you. Which one(s) are you most interested in? Why? Which interest you the least? Why? (4 or more hours)

5. What is occular pathology? What does a pathologist do? How is he part of the eye care team? Describe the physical set-up of the pathology lab. What are typical procedures? What kinds of reports are made? What legalities are involved in pathology? What personnel are needed?

6. Ophthalmic photography is an important and rapidly growing area of medicine. What are the qualifications of an ophthalmic photographer? What equipment does the photographer use? Describe his/her set-up. How many different staff members are involved in ophthalmic photography? What are their tasks? Why are photographs taken? What legal information do these photographs provide? How is the patient handled when the photographs are being taken? What information does the patient receive? Why is this information important?

Is there any risk to the patient? How are the slides/photos stored? Why are they kept? How does the ophthalmologist use the slides/photos? (4-6 hrs.)

7. Frequently ophthalmology clinics are located in teaching institutions, that is, in medical centers or universities where the ophthalmologists double as teachers and doctors. Interns and residents in these clinics are learning medicine while they are helping to treat patients. How is the "teaching care concept" received by the patient? How do patients seem to react to the "clinic care concept?" What is your opinion about patient care in a teaching institution? Do you think the patient care in a clinic is equal to, worse than, or better than care in a private office or a non-teaching clinic? (2 hrs.)

8. Research is often carried on in a clinic, especially if it is a teaching clinic. What kinds of research are undertaken? What is the purpose of the research? How is research funded? Who is involved? How is a grant begun?

If you visit the Eye Clinic at Pacific Medical Center, you can explore two research projects:

a. SIMO (Self-Instructional Method of Ophthalmology). This project is committed to the task of preparing self-instructional audiovisual materials designed to help medical students learn about ophthalmology. What is the purpose of the project? What regulations are placed on the project by the funding agency? How is success measured? What personnel are involved in this project? What are their qualifications? Their tasks? Review several of the videotapes which have been produced. These tapes will help you learn about the eye; how would you rate their level of difficulty? How would you rate the success of the SIMO project? Do you believe such tapes could become a useful part of a high school curriculum? Devote several pages in your journal to answering these questions. (4-6 hrs.)

b. Doxium--Diabetic Retinopothy. Determining the effect of a drug--doxium--on retarding or halting the progression of a retinal disease common in diabetics is the focus of this project. How is the project being carried out? What kinds of patients are involved? How are patients received, screened, and followed? What criteria for success have been set? What steps have project staff taken to avoid prejudice or mistaken conclusions? What is the function of each test used in the project? How are the results of these tests recorded? How are the data analyzed? What results have been reached to date? How are records kept?

What personnel are involved in this research project? What are their qualifications? (4-6 hrs.)

9. If there is a medical library available to you at the clinic/office you are visiting, learn to use it. When planned activities have to be rescheduled or when your supervisor is too busy to help you, you can use the library to read up on the pathologies you have been learning about. You might ask your supervisor to suggest readings for you to study. (2 or more hours)

10. Does the clinic/office you are visiting have a manual for patients and visitors? If not, would they like you to design one? In this manual, you could explain the functions of the clinic/office, the purpose of various tests and treatments, the steps a patient should follow, and other relevant information. Discuss the possibility with your supervisor. He or she will help you decide which information to include in the manual and also help you find the information you will need for your descriptions of functions, tests, and procedures. You might find it helpful to share this activity with other students who will be coming to this placement. (10 or more hours)

The Biomedical Practicum staff thank Ms. Irene Chriss of Pacific Medical Center, San Francisco, California, for her help in developing this module.

Biomed Practicum

Curriculum Module

PHYSICAL THERAPIST; PT ASSISTANT, AIDE

Instruction, physical conditioning, encouragement...these are the diverse roles of the physical therapist who helps the victims of illness and accident progress from physical handicap to a degree of independence.

The physical therapist has a rehabilitative role, one of restoring function and preventing disability following a patient's disease, injury, or loss of limb. The therapist's goal is to help the patient reach his/her maximum performance and to resume a life in society while learning to live within the limits of any lasting disabilities.

The therapist treats many different kinds of patients. He or she may give aid to a preschool victim of cerebral palsy, teach the aged the painstaking process of walking following a stroke, or restore the personal confidence and the physical usefulness of the middle-aged foreman who has been the victim of a factory accident. Each case carries with it the satisfaction of helping people learn to help themselves. Teacher, conditioner, psychologist--the physical therapist is all of these.

The treatment the therapist administers is prescribed by the patient's physician. When beginning with a new patient, therapists often use a strategy of discovering which activities the patient can successfully complete and building the patient's self-confidence on his success with those activities. Then the therapist begins the prescribed treatment, concentrating on both physical and mental improvement. Often, the therapist must also instruct the parents and family in special care the patient needs.

Personal qualifications. Major emphasis must be placed on the personality traits of the physical therapist. He/she must be warm, friendly, and understanding--an outgoing person. Ability to establish a relationship of constant encouragement with the patient will greatly benefit the patient's process of recovery. A very necessary quality is the sincere desire to work with the handicapped. Working with people who have crippling conditions does not appeal to and cannot be handled by everyone. To meet successfully the physical demands of the occupation, the physical therapist must be in good health and should be at least of average build.

Education. Three basic plans exist for the education of the physical therapist. (a) A bachelor's degree in physical therapy, which requires four years to complete in an approved college or university. (b) A certificate program is available to students who have completed a bachelor's degree with a major other than physical therapy, and who have taken particular science courses. The certificate program, which takes 12 to 16 months to complete, is considered equal to the bachelor's degree in physical therapy. (c) A master's degree program in physical therapy usually requires a bachelor's degree for admission and takes two years to complete. Upon graduation, a therapist with a master's degree usually finds employment in a teaching or supervisory position.

NOTE: It is recommended that a pair of students be placed in physical therapy departments; because of legal complications, activities have been designed for pairs of students.

Field test version: 6/15/74

The curriculum of a college physical therapy program usually includes the humanities and social studies plus scientific areas emphasizing anatomy, physiology, pathology, biology, chemistry, and physics. Specialization courses provide the fundamentals of patient treatment. Supervised clinical practice completes the course. A new graduate will profit greatly by working under the supervision of a qualified, experienced physical therapist as this is increasingly being used as a qualification for employment.

Two California schools offer a master's program:

Stanford University: Division of Physical Therapy, School of Medicine, Palo Alto, California 94305.

University of Southern California: Department of Physical Therapy, Rancho Los Amigos Center, 12933 Horton Ave., Downey, California 90242.

Bachelor's degree and certificate programs are offered at these schools:

California State University, Fresno: School of Professional Studies, Allied Health Professions, Fresno, California 93710.

California State University, Long Beach: Physical Therapy Department, School of Applied Arts and Sciences, Long Beach, California 90801.

California State University, Northridge: Department of Health Sciences, Physical Therapy Curriculum 18111 Nordhoff St., Northridge, California 91324.

Children's Hospital of Los Angeles: School of Physical Therapy, 4650 Sunset Blvd., Los Angeles, California 90054.

Loma Linda University: Department of Physical Therapy, SHARP, Loma Linda, California 92354.

University of California, San Francisco: Curriculum in Physical Therapy, Third and Parnassus, San Francisco, California 94143.

University of Southern California: Department of Physical Therapy, Rancho Los Amigos Center, 12933 Horton Ave., Downey, California 90242.

Financial Assistance. Various colleges, agencies, and industries offer qualified students financial assistance in the form of scholarships and loans. For a list of sources, or for more information about physical therapy, write to: American Physical Therapy Association, 1156 15th St. N.W., Washington, D.C. 20005.

Salary. In California, the usual salary range for a physical therapist is $10,500 to $13,500 per year. In administrative and teaching positions, the salaries are $14,000 and up annually.

Related occupations.

An occupation allied with rehabilitation is the physical therapy assistant. This person is a skilled technician who assists the physical therapist in treating patients and in related activities. Licensure or registration may be required of the PT assistant before employment. The PT assistant must obtain a two-year associate degree from an accredited community or junior college. The only California college which offers such a degree is De Anza College, 21250 Stevens Creek Blvd., Cupertino, CA 95014. The course of study covers biological, physical, and social sciences; humanities; physical therapy technical courses; and clinical experience. The PT assistant may resume his studies and become a bachelor's degree or certified physical therapist if he/she wishes. $600-800 per month is an average starting salary in California.

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The physical therapy aide is less highly trained than the PT assistant. She/he receives on-the-job training in performing operational tasks such as clerical and equipment maintenance duties. Patient-related activities that the aide may assume include preparing the patient for treatment, assembling equipment, and assisting the patient in practicing the exercises. Those interested in becoming aides should contact the chief physical therapist or personnel director of their local hospital. In California, the usual starting salary is $500-700 per month.*

PRACTICUM ACTIVITIES

1. Objective: Show that you understand the functions of the different kinds of staff members in the physical therapy (PT) department you are exploring. Show how the role of the PT department fits into the larger institution it is a part of.

A good way to begin your exploration is to find out how the physical therapy department fits into the hospital or clinic in which it is located. To help introduce you to the role of PT within the larger environment, your activities supervisor will take you on a tour of the facility (hospital or clinic). Afterwards, the supervisor will introduce you to the PT department itself. As you tour the facility and the department, note the types of personnel who work in the facility: technicians, aides, head nurses, managers, physical therapy assistants, to name a few. In the PT department itself, find out about the different levels of personnel (such as physical therapist, physical therapy assistant, physical therapy aide, physician, receptionist, and possibly others). What tasks does each person perform? How are their tasks related? Different? How do they depend on each other?

2. Objective: Show that you know the purpose of the kinds of paperwork and telephone matters used in the PT department.

The physical therapist and the physician have an imperative relationship: without a prescription from the physician, the PT cannot, under law, perform his duties. Because of this, there is a great deal of absolutely essential paperwork produced and received in the PT department. Some of this paperwork includes: charts, billings, appointments, departmental statistics, and patients' records. At the same time, you will learn the types and purposes of phone calls received in the department, how messages are routed, and which employees handle these matters. (2 hours)

3. Objective: Explain to your teacher/classmates the legalities which regulate physical therapy.

Physical therapy is an area of health care that is regulated by federal and state laws. Reading over and/or discussing the legal side of physical therapy will help you better understand therapy; the department you are exploring probably has copies available which you may use. In addition, most departments have their own guidelines and regulations. It would be very helpful for you to discuss these with your supervisor so that you will understand what is expected of you and of the PT staff.

Physical therapy is also regulated by the American Physical Therapy Association; its members have prepared and adopted a code of ethics which is strictly adhered to by most therapists. For example, therapists sometimes disagree mildly or even strongly with a physician's prescriptions; find out how the therapist who follows the code of ethics must act in such a situation. Discuss with some therapists how they have handled some cases in which they disagreed with the patient's physician.

After reading the code of ethics, you might add a section to your journal about how the code strikes you and how you would feel about working under such a code if you were a physical therapist.

Occasionally a therapist will encounter a patient whose motives are unethical. Some patients may try to exaggerate discomforts or prolong absences from work or extend their disability payments. How do the therapist and physician respond in such situations?

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*Above introduction adapted from Health Career Facts, Health Careers Program, P.O. Box 4387, Madison, Wisconsin 53711.

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Some questions you might treat in your discussions and/or journal: What happens when a therapist disagrees mildly with a physician's prescription? If he disagrees strongly? Does the therapist involve the patient in these disagreements, perhaps by seeking the patient's opinion? You may find that different staff members have different opinions on this topic; compare them and try to determine what makes them react differently to this problem. What would happen if one therapist disagreed with another's treatment of a patient? What could happen to a therapist whom a patient "conned" into signing a disability statement which was proved later to be false? (4-6 hours)

4. Objective: Be able to understand and use PT vocabulary well enough to communicate accurately with the PT staff you are working with.

It is important for you to learn the "jargon," or vocabulary peculiar to physical therapy. The best way to learn is probably to ask for an explanation each time you hear a new word or phrase. You might find it helpful to keep a vocabulary list to help you remember these new terms. If allowed, read the charts/records of several patients; learn the meaning of any terms on those records which are new to you. (2-4 hours)

5. Objective: Describe the major categories of PT treatments. Outline the procedure a PT patient follows, including entry to the PT department, treatment, reporting, and discharge.

The second or third day's activities might begin with your tracking a patient through the PT department. The types of patients and their problems will vary according to the kind of facility you are visiting, but will likely fall under these broad categories: pediatrics, breathing and postural draining, neuromuscular disorders, cardiovascular disorders, and musculoskeletal disorders. Choose a patient and follow his/her activities from the time he/she arrives in the PT department. Discuss his/her prescription with the therapist who will administer the treatment. Watch the treatment; afterwards, talk over your impressions with the therapist. Find out how the treatment and results are recorded on the patient's record; how is the patient's progress communicated to the patient's doctor?

When you have learned all you can about your first patient, select another to track and continue with this type of activity for the rest of the day. Try to select patients whose conditions represent the major categories discussed above; try also to observe a cross-section of the many kinds of treatment performed by physical therapists.

You may be able to observe treatment in the whirlpool bath; bring a bathing suit with you each day. (4-10 hours)

6. Objective: Explain the decision-making hierarchy in a PT department.

How are decisions made in the PT department you are visiting? Who has decision-making authority? What kinds of decisions do the therapists make? The aides? Assistants? Receptionists? What kinds of decisions do doctors usually make? Under what conditions do doctors delegate to the therapist decisions about a patient's treatment? (1-2 hours)

7. Objective: Show that you have learned how a PT uses the principles of breathing and muscle contraction in breathing and other exercises.

Based on the Biomed unit on respiration, you should be able to understand the theory behind PT treatment of respiratory problems. In addition, muscular rehabilitation will give you an introduction to the second-year Biomed curriculum which will treat fully the anatomy and musculoskeletal structure. If two or more students are visiting the same PT department, students can pair up to imitate the therapist-patient session. Two PT treatments are closely related to the Biomed curriculum: breathing exercises and rehabilitation activities for the stroke or accident victim.

By experiencing both the therapist's and patient's role, you should develop a good comprehension of the way theory is put into practice.

After you fully understand these treatments and the principles behind them, you and your partner might try out other treatments the therapists are using. (2-4 hrs)

8. Objective: Describe five or more different ways of developing motivation in a PT patient; relate different motivational styles to particular kinds of patients and problems.

Motivation--helping the patient develop the will to improve and return to normal or near-normal living--is a major side of the therapist's job. Different people are motivated in different ways; the therapist must be a sort of psychologist in deciding which strategy to use with a particular patient. Keep notes on the motivational styles and tactics you see used; look for recurring themes and patterns in your notes. After you have kept notes for several days, can you describe five or more typical motivational tactics? In a section of your journal, can you relate these five tactics to particular kinds of patients or problems? To particular kinds of therapists? Are different tactics used with different age groups? With different sexes?

The interaction between the patients and the therapist will be different with each therapist you observe; some take a fatherly or motherly position, while others are more aloof and prefer a businesslike, patient-practitioner relationship. Classify and describe in your journal the different kinds of interaction you notice; which style do you think you would choose if you became a therapist? What would be the reasons behind your decision? (4-6 hrs)

9. Objective: Demonstrate proper sterilization procedures for the whirlpool bath.

Learn how sterilization techniques are used in physical therapy. For example, the whirlpool bath is sterilized after each patient's use. Depending on the facility you are in, you may observe or participate in the sterilization of the pool. It would be interesting to make a culture from the side of the pool after it has been sterilized to find whether the sterilization procedure was effective. (See Nutrition unit, Lesson 51, for a review of sterilization. Lesson 1 in the Neurophysiology unit deals with preparation of cultures.) (2 hrs)

10. Objective: Explore the careers of physical therapy aide and assistant.

Begin by reviewing the legalities affecting the professions of PT aide and assistant. If possible, read over a job description for those careers (job descriptions can often by obtained from the PT department director). Spend half a day observing the activities of peoole in those careers; assist them whenever you are allowed to. What is the difference between their jobs? What is the difference between the jobs of physical therapist and physical therapy aide? Between therapist and PT assistant? What are the advancement possibilities for an aide or assistant? What is the future job outlook? Is a career ladder available, beginning as an aide or assistant, and working up to therapist? What accompanying education, if any, would be required? (2-4 hrs)

11. Objective: Evaluate your interest in and aptitude for a career in physical therapy; discuss your interests and perceptions with a therapist.

Toward the end of the week, take a good look at careers in physical therapy (including therapist, assistant, aide, and receptionist); is there a career possibility for you in the physical therapy field? Consider this possibility in a short essay in your journal. Consider your interests and developed abilities (including problem-solving ability, your personality, scientific knowledge, ability to work with people, physique) as well as your educational plans and opportunities. Discuss your perceptions with your family, teacher, and classmates as well as with the therapist. In your journal, look at both the good points and the bad ones.

The Biomed Practicum staff thank Peter Edgelow of Hayward, California, for his help in developing these activities.

Biomed Practicum
Curriculum Module

PSYCHIATRIC SOCIAL WORKER

Do you often wonder about people's lives? Why are some people at ease in social relationships while others have a hard time getting along? Why are some people independent and self-reliant while others are unhappy and unable to make decisions? All of us care about particular people, but it is an exceptional, dedicated person who cares enough about all people to pursue the field of psychiatric social work. Prerequisites for this career are a special combination of personal qualities--genuine respect and liking for people, objective good judgment, ability to work as a member of a team, above average intellectual ability and tolerance of people who live and think differently.

If you become a psychiatric social worker, you will be an indispensible member of the professional team planning for and providing services to disturbed or mentally ill individuals, their families, and their communities. The psychiatric team usually consists of the psychiatrist, psychologist, nurse, psychiatric social worker, and psychiatric aide of which the social worker is the first member to have contact with the patient and his family who come for treatment or diagnostic evaluation. The psychiatric social worker determines, through interviews with the patient, his family, possibly employer, close friends, and others those conditions in the patient's background that have played a role in his or her emotional development, health, attitudes, and problems. The resulting compiled social history is one of the important documents used in diagnosing a patient's illness and determining a proposed treatment plan.

Sometimes the psychiatric social worker carries out a part of the treatment plan by seeing the patient for regular counseling whether the patient is hospitalized or participating in a clinic program. The psychiatric social worker supplies emotional support and encouragement by counseling, by bringing the patient in touch with community resources which could assist him or her in finding employment, obtaining financial assistance, caring for dependents, or finding a place to live. Oftentimes a person with psychological problems needs a complete change of scene in order to become a fully functioning individual again, and, as the primary link between the patient and the community, the social worker must bridge many gaps with expertise and responsibility.

Psychiatric social workers are employed in hospitals, clinics, courts, correctional institutions, guidance centers, industrial concerns, large school systems, and public health departments. They may also teach in colleges, universities, or schools of social work.

EDUCATION: At the high school level, extra-curricular activities which require people contact are advisable--such as volunteer work at hospitals or camp counseling.

Field test version: 7/12/74

A Baccalaureate degree from an accredited college is required for admission to a graduate school of social work. A well-rounded undergraduate program including the social and biological sciences as well as liberal arts is preferred. Some colleges offer a group of undergraduate courses related to social work and, although not required, they can be very helpful. A basic course in statistics is required by some schools, and skills in writing and public speaking are encouraged.

Since the psychiatric social worker is a specialized social worker, a Master of Social Work degree is required. The master's degree in social work program consists of class and field instruction (one-half to one-third of the semester hours are carried in field instruction). Many schools require the completion of a master's thesis or research project at the end of the two years of graduate study. A master's degree in social work provides the entrance requirement to the social work profession and wide opportunities for choice of employment, and advancement, if desired, to leadership positions.

Many vital social work tasks are carried out by college graduates. Health and welfare agencies offer staff development programs and on-the-job training which can lead to professional preparation through a fellowship or work-study program sponsored by the agency.

There are many work-study grants, scholarships, non-interest loans and fellowships offered for graduate professional social work education available through such sources as schools, federal, state and local level governmental agencies, fraternal groups, foundations, and local health and welfare agencies. Generally, grants are awarded on the basis of professional promise and financial need. Most grants provide full or partial tuition; some include living allowances. For a list of accredited schools for professional social work and financial aid information, write for the pamphlet, Social Work Fellowships and Scholarships in the United States and Canada, published by the Council on Social Work Education, 345 East 16th Street, New York, N.Y. 10017.

SALARY: Beginning workers holding master's degrees usually earn around $9,000-12,000 a year. Social workers with experience, particularly those in supervisory and administrative positions, may receive $12,000 and up.*

PRACTICUM ACTIVITIES

1. In order to get a good overview of psychiatric social work, you should observe clients, staff, the setting, and keep a record in your journal of such things as: (a) positive and negative reactions to staff, and to the setting; (b) special characteristics of patients (depression, cheerfulness, agitation, isolation, contact with reality); and (c) any general ideas and suggestions you may have about the effectiveness/ineffectiveness of the services being provided. Below are some possible activities:

    a. Investigate social and vocational programs within mental retardation programs.

    b. Tour a psychiatric in-patient ward.

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*Adapted from Health Career Facts, Health Careers Program, P. O. Box 4387, Madison, Wisconsin 53711.

c. Attend selected staff meetings and case conferences.

d. Tour jail facilities under direction of Community Mental Health Services Criminal Justice Team.

e. Observe patients in medical and psychiatric outpatient waiting rooms.

f. Observe applicants and clients in a social security office.

g. Tour inpatient and outpatient facilities of San Francisco General Hospital.

h. Visit a social developmental center for developmentally disabled. (4-6 hrs. per site.)

2. In order to develop skills in observing and documenting the range of difficulties patients present, how they present them, and their degree of illness, special attention should be made to the range of services provided for the emotionally disturbed and mentally ill. Are there more patients with a particular problem in certain age groups? What is the sexual, racial, and numerical breakdown of patients ranging from acutely disturbed and hospitalized to ambulatory and coping? (4 or more hrs.)

3. One out of every ten persons in the U.S. suffers from emotional or mental disorders serious enough to require professional attention. Given your observations of the range of illnesses, hypothesize as to the major reasons behind such an alarming rate of mental problems. (2 hrs.)

4. The person with a mental or emotional problem is sick and most of the time cannot help it. Observe and assimilate differences in setting and in the functioning and responsibilities of staff members, all of whom are working toward the goal of restoring the patient's ability to function up to his or her full capacity or within accepted limits. Can you suggest ways for improving either the physical setting or a staff member's tasks to further this goal? (4 or more hrs.)

5. An important part of your involvement in this placement should include self-discovery. Be aware of your own reaction to the variety of problems and psychiatric disorders you encounter. How do you cope with belligerence, excessive moodiness, exaggerated worry, suspiciousness and mistrust, selfishness and greediness, helplessness and dependency, and poor emotional control? Be very specific and honest. (2 hrs.)

6. Describe yourself at six years, twelve years and present, noting emotional, attitudinal and mental changes/differences in yourself. What changes do you think will take place by age 25? Age 50? Age 65? (1-2 hrs.)

7. If you have a chance to spend time in a crisis-intervention center or 24-hour hotline or suicide prevention center, you might determine what problems are brought to the center's attention and how they are handled. What are the qualifications of the people at the center? How important do you think these jobs are to the community? Should such centers be financed by the public rather than by donations as most of them are now? (2-4 hrs.)

8. If you wish to pursue some additional activities on your own, possibly in the afternoon or evening, here are some suggestions:

a. Interview at least six citizens (perhaps in your neighborhood) about their feelings about the mentally ill being housed and treated in the community instead of in restricted, special mental institutions. Try to choose citizens to interview who are of different sexes, ages, and races. (4-8 hrs.)

b. Interview a geneticist about his/her feelings about reproduction between mentally retarded adults, Huntington's chorea patients, and in cases where one potential parent is Rh negative and one is Rh positive. (1/2-1 hr.)

9. If you are placed in a psychiatric day treatment program, you might assist patients in shopping, preparing refreshments and meals. Social and recreational activities may happen which you could participate in under the direction of a staff member. (4-10 hrs.)

10. If you are placed in the Downtown Senior Center, talk with your supervisor about possible outings that you could go on and accompany patients. You might help with grocery shopping and meal preparation. (4-10 hrs.)

The Biomedical Practicum staff thank Mrs. Ralphyne MacDonald of San Francisco, California, for her help in developing the above activities.

Biomed Practicum

Curriculum Module

ULTRASOUND TECHNICIAN

The ultrasound unit is an important adjunct of the hospital's X-ray department. Although the unit is an integral part of the hospital complex within which it resides, it is also a fairly autonomous unit. The administrative details of directing such a unit and the technical work with patients who are referred to the unit are both the responsibilities of the ultrasound technician.

First and foremost, the job of ultrasound technician is to perform diagnostic ultrasound tests on the patients referred to the unit. The technician operates the equipment used to do ultrasound scans and reads the pictures that are taken, giving an opinion on what they show. He/she is also responsible for calibrating the equipment he uses. Organizing the filing system, making appointments, and making sure that supplies are always available when needed also fall within the domain of the ultrasound technician. In some instances the ultrasound technician may also be responsible for training other persons in the use of the ultrasound equipment and interpretation of ultrasound scans.

Personal qualifications. The ultrasound technician must be capable of working without supervision within guidelines set by a department head. He/she must have the ability to deal with all kinds of people, as well as a feeling for the sophisticated instruments which he uses to perform the ultrasound scans. Because the field is so new, it is also desirable that the ultrasound technician be a teacher, passing knowledge on to others by training them in ultrasound uses and techniques.

Education. The requirements for this field have not been established. However, a few general guidelines have been suggested. For high school graduates, a two-year program has been suggested. It would include one year of studying such subjects as anatomy, physiology, pathology, evaluation of laboratory tests, patient care, office procedures, etc. The second year would concentrate on training in the ultrasound unit and would include extensive on-the-job training and an internship in the unit. Training programs offered to persons who already hold a paramedical degree would simply require one year of experience and training in an ultrasound unit.

The educational requirements noted above are only suggested guidelines: they have not been established as standards. However, national committees are now in the process of setting educational and certification standards. If you are interested in a career in ultrasound, check periodically with practitioners to find out about developments in these areas.

Salaries. A salary scale has not been established in this field because so

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Field test version: 6/17/74

few individuals are working in it. However, salaries fall roughly within the same range as those of an X-ray technician, $850 to $1000 per month.

PRACTICUM ACTIVITIES

1. Meet with the technician who is coordinating your activities. He/she will familiarize you with the equipment that is used in this particular field of diagnostic medicine. Very simply stated, the function of the equipment you will see is to take "pictures" of the internal organs of a person's body, using ultrasound. The technician will give you a basic explanation of how the equipment accomplishes this function. He/she will also explain how to operate the equipment, show you a number of ultrasound "pictures," and explain how the images on these "pictures" correlate with a particular anatomical area of the body. You are bound to have a number of questions--everyone who sees ultrasound does. Do not hesitate to ask them. A clear understanding of the principles of how the equipment takes ultrasound pictures and how these pictures relate to the structure of the human body will make the rest of your time spent in the ultrasound unit much more meaningful. Some specific questions you might want to be sure you know the answers to are: What is ultrasound? How is it used to create a picture of a person's insides? What is the difference between A mode and B mode ultrasound scanning? What are they used for? How do the controls on the equipment function? (For example, what is the gain knob, how does it work and what is it used for?) In an ultrasound picture what accounts for the appearance of light areas? Dark areas? What does it mean to look at a part of anatomy in cross-section? In longitudinal section? What relationship is there between the number of echoes that return from a specific type of tissue and that tissue's relative homogeneity or heterogeneity of structure? For example, would a homogeneous mass reflect more sound (create more echoes) or less than a heterogeneous mass? What are some of the diagnostic applications of ultrasound? Compare ultrasound and X-ray as diagnostic tools. Are there any things that ultrasound can do that X-ray cannot? Give some examples. Do you see any connection between the principles used in ultrasound and any of the material that you studied in Unit III of Science? (2-3 hours)

2. The ultrasound unit contains more than the equipment used to take the ultrasound pictures. There are also viewing screens, files, appointment books, a small library of reference books, among other things. Try to get a feel for how the unit as a whole operates. How are the files kept? How are appointments made? What is the maximum number of patients per day that the unit can do tests on? What is the average number of tests done per day? What reference books are available in the unit and what are their particular uses? (1-2 hours)

3. The ultrasound unit is not independent from the rest of the hospital but an integral part of it. After you have been introduced to the unit, the technician will take you on a tour of the hospital facilities so that you can get a feel for how the ultrasound unit fits into the larger hospital complex. You may wish to make some notes describing how the hospital utilizes the ultrasound unit. What are some common instances in which a patient is referred to the unit? Are there some wards in the hospital that make more use of the ultrasound unit? Which ones? How are patients referred to the unit?

Are there some wards in the hospital that make more use of the ultrasound unit? Which ones? How are patients referred to the unit? How are arrangements made for the patient's transfer to and from the unit on the day of his/her examination? (1 hour)

4. The ultrasound technician will show you how to calibrate the equipment. You may be able to perform some of the calibrations yourself. What calibrations are necessary? How are they made? How often does the equipment have to be calibrated? If you performed some of the tests describe the ones you did. Did calibrating the machinery give you a better idea of how it works? Give an example. (1 hour)

5. One of the organs in the body which is commonly examined using ultrasound is the brain. When ultrasound is performed on the brain, it is known as echoencephalography. If there is a brain in the unit you will be able to run some ultrasound tests on it. If you have a willing partner, you may be able to do some scans of each other's brains under the supervision of the ultrasound technician. What kind of scan (A or B mode) is used on the brain? What are some diagnostic uses of echoencephalography? What is the midline of an echoencephalogram and what is its significance? If you and a partner were able to perform echoencephalography on each other, how did it feel when you were the subject? Was it easy to do the test on another person? How did echoencephalograms you did compare with those done by the ultrasound technician? Were they clear? If not, what things do you need to practice to obtain good results?

Look at some abnormal echoencephalograms that are on file in the unit and compare them with some normal ones. What types of deviations signify abnormality? Can the type of abnormality be determined by reading the echoencephalogram? If so, how? If not, why? (2 hours)

6. Spend a day or two observing ultrasound tests being done on patients. Before the patient is brought down to the ultrasound unit the technician and doctor usually review the patient's chart. Take a look at the chart. How is it organized? What information does it contain? Ask the technician to explain why the patient is being brought to the unit. What is wrong with him/her? What are they looking for when they perform the ultrasound test? Observe the kinds of information that the technician wants to haveat her/his disposal before examining the patient. For example, the technician will want to know if any other pertinent tests have been performed and if so what the results were.

Some ultrasound tests also require that the patient be specially prepared beforehand. Ask the technician to explain what different types of preparation are done and what the reasons are for these preparations.

When the technician is ready for the patient, he/she is brought down to the ultrasound unit. How does the technician greet the patient and try to make him/her comfortable? If a patient is reluctant or afraid to take the test, how does the technician handle the situation?

Once the patient is in the unit the next step is to transfer him to the table where the tests will be performed. Often patients are weak because they are ill and they need help to make the move over to the table. How does the technician help them? Are there special ways of maneuvering the patient into various positions?

The patient is placed either on his back or his stomach on the table, depending upon which organs need to be visualized. Why do you think it makes a difference which position the patient is in? Which position would you put a patient in if you wanted to visualize the kidneys? Liver? Abdominal area? Pelvic area?

After the patient has been properly positioned, the area to be examined is covered with mineral oil. Why is this done?

Now the examination is performed. The technician scans the area in question, first taking cross-sectional pictures and then longitudinal pictures. The pictures are taken moving down the body or across it at 2 cm intervals. Why this distance? Note how the scanning is done. How is the equipment operated? When are pictures taken and what information is recorded on the back of each picture? What are the different levels of gains used for? Were both A and B modes used? Were you able to visualize the organ the technician was examining? What other organs were you able to see? The technician will point out some organs on the screen. Does their location and shape make sense to you? If not, make a note of the picture you were looking at and ask the technician to explain it to you after the examination is over. How does the patient react to the examination? What manner does the technician assume toward the patient during the examination?

Many times after the technician has finished examining the patient, the doctor (if he/she is present) also takes a look at the screen. Does he do anything differently? How do the doctor and technician relate to each other? How does the doctor relate to the patient?

After the examination is completed, the patient is returned to his room. At some time later in the day, the technician and doctor get together to read the pictures they have taken and dictate a report to be placed in the patient's chart. You probably will not have the opportunity to sit in on this discussion as it generally occurs late in the day, after all the cases have been finished. However, you should take a look at the report that is dictated and placed in the patient's chart and find out how the diagnosis was reached. You might also note the wording of the report.

What kinds of cases did you see the most often? In how many instances was the ultrasound examination useful in determining the final diagnosis of the patient's ailment? Give some examples.

As you observe various cases being done over a period of a few days, take detailed notes on two or three of them, answering in your journal all the above questions as they relate to each patient. (10 or more hours)

7. If you have any extra time you might try:

a. drawing some cross-sectional anatomy pictures of some parts of the body that are examined using ultrasound;

b. comparing cross-sectional anatomy layouts in a book (available in the unit) with ultrasound pictures of that same area;

c. examining ultrasound pictures of areas of the body and seeing whether you can locate the organs visualized in the picture.

The Biomed Practicum staff thank Linda McKay of Mount Zion Hospital, San Francisco, California for her assistance in developing this module.

Biomed Practicum

Curriculum Module

VETERINARIAN

If you have a fondness for animals and if being part of the nation's health team appeals to you, then veterinary medicine may be the career for you. If you like to work with farm animals, you will prevent, control, and eradicate livestock and poultry diseases, and insure that meat and meat products are disease free.

In small animal practice, you will be concerned with maintaining the health of pets such as dogs, cats, and birds. If you are interested in the field of education, many teaching opportunities will be open to you to instruct veterinary students.

There are approximately 29,000 veterinarians in the U.S. and 2,500 in Canada. It is anticipated that 40,075 veterinarians will be needed to satisfy public needs in the U.S. alone by 1980. Unless enrollment in colleges of veterinary medicine increases substantially, less than 33,000 veterinarians in the U.S. will be available in 1980, creating a shortage of about 7,000.

EDUCATION--VETERINARIAN: While there are more than enough applicants to veterinary schools, there is room for only one out of about 4.6 applicants. Unless additional financial support is made available to the 19 schools of veterinary medicine in the U.S. and Canada, they cannot increase their enrollments. Thirty-two states do not yet have schools of veterinary medicine; one of these, Florida, is currently creating such a school.

Veterinary school is an expensive proposition in terms of both time and money. It takes from six to eight years of study to earn the DVM or VMD degree; in addition, a rigid licensing examination must be passed before a veterinarian can practice. Veterinary schools recognize the need for more readily available financial assistance for students of veterinary medicine, such assistance is difficult to obtain. Hopefully, the absurd situation between need for veterinarians and opportunities to study veterinary medicine will be reconciled within the next few years, provided that state and federal legislators take a hand in solving the problem.

All veterinary schools require a minimum of two years of pre-veterinary college study for entrance, and four years of study of veterinary medicine for graduation. However, because of the difficulty in gaining admission to veterinary schools, applicants have frequently completed four years of pre-veterinary study and applied several years in a row before they are accepted.

The schools of veterinary medicine in the U.S. and Canada are located at Auburn University in Alabama, University of California at Davis, Colorado State University, Cornell University in New York, University of Georgia, University of Guelph in Ontario, Canada, University of Illinois, Iowa State University, Kansas State University, Louisiana State University, Michigan State University, University of Minnesota, University of

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Missouri, Universite de Montreal in Quebec, Canada, Ohio State University, Oklahoma State University, University of Pennsylvania, Purdue University, University of Saskatchewan, Texas A & M University, Tuskegee Institute in Alabama, and Washington State University.*

SALARY: Although the expenses of setting up a private practice are high and the first few years of practice reflect income below the average for veterinarians, the financial rewards are good for veterinarians, often on a par with dentists and and physicians. More and more, several veterinarians are joining together in a clinic situation where the initial costs are less than private practice and the annual salary about as good.

PRACTICUM ACTIVITIES

1. It is a good idea to begin by touring the office and finding out the regulations you will be expected to follow. What expectations does your supervisor have of you? Discuss with your supervisor the activities you are most interested in exploring in the veterinary office/clinic. (1 hr.)

2. What is meant by "large-animal practice" and "small-animal practice?" This question can be the beginning of an investigation of veterinary specialties. What is involved in specializing in a particular area of veterinary medicine? Is more education required? (2 hrs.)

3. Describe in your journal the kinds of positions that are usually found in a veterinary office/clinic. What training and background are needed for each auxilliary position? What tasks are associated with each position? How do these positions interrelate? (2 hrs.)

4. Write a brief report on the common drugs and dosages prescribed for small and large animals by the clinic. Find out what effects these drugs induce, and what dosages are dangerous or lethal. (3-4 hrs.)

5. Work with a pet from the time it comes to the reception desk until its treatment is completed. Keep a diary of what happens to that pet, recording how it is treated by others, how you treat it, how it responds to you and to other staff, the problem for which it is being seen at the clinic, the medical treatment given, and the prescription. Do this for 9 - 10 pets. Try to select a cross-section of pets who are in for a variety of treatments. (6-10 hours)

6. Learn how to run the various types of tests which the clinic performs on animals (mostly urinal and fecal) and, if allowed, do your own analyses of samples. Compare your results with the staff's for a test of your accuracy. (4 hrs.)

7. Prepare for your journal a report on the parasites and other identifiable organisms you find in fecal samples. Illustrate your discussion. List the steps one must take in order to analyze such samples properly. (2 hrs.)

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*Above information taken from Veterinary Medicine, Its Requirements and Responsibilities, and Career Facts About Today's Veterinarian, American Veterinary Medical Association, 600 S. Michigan Ave., Chicago, Ill. 60605, 1973.

8. Spend some time in the front office, learning not only the ways the public is served, but also how the office is run. Report on the clinic's procedures for appointments, billings, prescriptions, etc. which are taken care of in the office. (2 hrs.)

9. List the steps an animal must go through when it needs surgery, from beginning to end. Explain why these steps are necessary. (1-2 hrs.)

10. List all the things that go into proper care for a pet and why each thing is important. You should also be able to describe the major dog and cat diseases, when and how they strike, what the symptoms are, cures, and preventative care (6 or more hours)

11. Using medical texts and other reading materials which may be available, research the way to perform an operation--such as setting a broken leg bone in a dog or cat. Inquire into the proper way to do some operations in which you are interested and to which you may have exposure at the veterinary clinic. (4 or more hours.)

12. Today some veterinarians are "pushing" neutering or "fixing" domestic animals. How do you evaluate this role of the veterinarian? What are some of the problems associated with dog and cat overpopulation? (1-2 hrs.)

13. Learn about animal anesthetics. Before an operation can take place, the animal must be temporarily put to sleep to insure it will remain quiet during the operation. Such anesthesiology on animals, as on humans, is a highly developed skill. What are the common anesthetics, how are they applied, in what doses, and how frequently? (2 or more hours)

Biomed Practicum
Curriculum Module

WATER QUALITY CONTROL

PRACTICUM ACTIVITIES

If you are interested in environmental affairs, find out what water treatment plants are doing to purify water. The plant chemist's duties, for example, usually include: running tests for process control, running tests for industrial waste, and testing and recording for regulatory agencies. He also trains new operators who work in the laboratory and in the operation of the plant itself. Such training involves teaching the operators to take samples and run the appropriate tests and also keeping operators updated on new developments in water treatment. As a practicum student, you may be able to collect water samples, analyze them in the plant laboratory, and report on bacteria, sludge and chemical content. This activity should appeal to students who are interested in developing basic knowledge about the process of water treatment and the basic skills used by people in the career and who desire some hands-on involvement in the application of chemistry and bacteriology.

1. Objective: Discuss your experience at the plant, including some of the following topics.

   a. A brief explanation of the plant operation.

   b. Possible career in water treatment.

   c. Some of the difficulties the staff has in keeping the facility running smoothly.

   d. Why this plant exists.

For an introduction to the operation of water treatment and career possibilities available at the plant, tour the plant with your supervising practitioner. Watch a demonstration of the different tests used in process control and discuss your perceptions with him/her. Feel free to ask questions--he will be glad to answer them. Your practitioner will probably introduce you to other staff members who are there; feel free to discuss their jobs and duties with them, too. (1-2 hrs)

2. Objective: Give your instructor and fellow students a brief, basic explanation of the water treatment process. Ask your supervisor whether there is a copy of an informational pamphlet on water treatment which you can read to obtain some additional background for this activity. (1/2 hr)

3. For the rest of the week, you can spend your time developing some basic knowledge and skills related to process control. In order to help in the plant's process control, you may be able to learn how to sample, test, and record data on water at its various stages in the treatment process. Much of your time will probably be spent in the plant laboratory. (4-20 hrs)

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The following are some possible objectives.

a. Show that you have learned to use laboratory equipment necessary for testing the influent, effluent, and sludge.

b. Show that you have learned to take samples, set up and run the appropriate tests, collect and compute the data, and record the results from the influent, effluent, and sludge.

c. Learn the meaning of these terms: influent, effluent, sludge, primary treatment, secondary treatment, tertiary treatment, anerobic, and aerobic. Your knowledge of these terms should be in relation to the context of water treatment and not mere dictionary definitions.

d. Develop enough basic knowledge about water quality control processes so that you can discuss them with your instructor.

e. Show what you have learned about career possibilities in water pollution control, including technical as well as professionnal positions and the education or training required for each.

4. Below are some additional activities which you can perform on your own, during times when your supervisor is too busy to give you much help. These activities could be reported on in your journal.

a. Keep a daily logbook of your activities, including new things you have learned, observations you have made, and your impressions of this experience.

b. Take water samples from several sources (such as your tap at home, a mountain stream, a community swimming pool) and use the facilities in the plant laboratory to analyze these samples the same way you analyze water samples from the plant. Compare these samples with water samples for bacteria content, sludge content, and chemical content. Report your findings in a brief paper, perhaps accompanied by drawings or photographs.

c. Keep a daily record of the samples you test at the plant. Record the test results and briefly explain the implications of the test results. Explain what action, if any, was taken as a result of these tests.

d. Take pictures of the plant and construct a display in the Biomed classroom in which you explain the stages of treatment which water goes through at the plant. Use your pictures plus sketches, written explanations, and any other material that might make this an informative display to people who have no knowledge about water treatment.

5. Objective: Evaluate three careers in water quality control. Take a good look at the careers available in water quality control. Devote a section of your journal to an analysis of three careers and your interest in them. Some things you should find out about each career are: educational requirements, working conditions, desirable personal qualifications of workers, ten-year job outlook, typical salary, promotion possibilities, psychological rewards of the job, typical work schedule, and other items you and the supervisor think of.

APPENDIX B

EVALUATION FORMS

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BIOMEDICAL PRACTICUM
Student Evaluation (by Supervisor)

Name of student______________________________ Date__________ Supervisor__________________

We would appreciate your helping us evaluate and grade students by answering these questions. Thank you for your cooperation.

1. Student knowledge about medicine/health. Please rate each item below in terms of how much you feel the student has learned about the item in his/her week with you. Circle the appropriate numbers. Leave blank if not applicable.

	a great deal			somewhat			not at all
a. increased knowledge of medical/health terminology	7	6	5	4	3	2	1
b. learned function of equipment	7	6	5	4	3	2	1
c. learned to operate equipment	7	6	5	4	3	2	1
d. learned specific occupational skills	7	6	5	4	3	2	1
e. learned medical/health concepts and principles	7	6	5	4	3	2	1
f. learned laboratory procedures	7	6	5	4	3	2	1

2. Student attitude and responsibility. Please evaluate the performance of the student assigned to you according to the following code: 0 = not applicable or not observed, 1 = poor, 2 = adequate, 3 = good, 4 = excellent, 5 = outstanding.

Over the past week, I have found that this student:

______a. maintains the agreed-upon schedule and is punctual.
______b. asks questions when he/she does not understand something.
______c. follows instructions carefully.
______d. is appropriately dressed and groomed.
______e. is cooperative.
______f. reads background information appropriate to this activity/department.
______g. is aware of the confidentiality of patient information and does not violate patient confidence.
______h. is developing those attitudes necessary for effective performance in a field related to patient care.
______i. shows an interest in learning new skills and procedures.
______j. interacts well with adults (staff and patients).

3. Student knowledge about careers. Please rate the student's knowledge about your career/related careers on the following scale:

	a great deal			somewhat			not all all
a. The student has learned about the responsibilities of someone in my profession.	7	6	5	4	3	2	1
b. The student has developed a realistic understanding of my career (educational requirements, working conditions, typical tasks, career ladders, etc.)	7	6	5	4	3	2	1

4. Other comments:

5. We are required by state law to report student attendance. If the student assigned to you missed any day(s), please mark A (for absent) in the appropriate box below.

Week of ________________

M	Tu	W	Th	Fr

Student-1
Pretest

BIOMED PRACTICUM

BIOMED STUDENT QUESTIONNAIRE

School______________________________

Your responses to this questionnaire are confidential. Do Not put your name on the questionnaire. Your responses will help us understand the effect of the program on instructors, health practitioners, and students. There are no right or wrong answers. Check the option that best describes your attitude.

1. In terms of health related knowledge, how well do you think YOU are prepared for the Practicum experience? (check one)
    A. Well prepared ____
    B. Moderately prepared ____
    C. Slightly prepared ____
    D. Not prepared ____

2. The Biomed Project combines both classroom training and practical experience. What is your attitude toward these two methods of learning? (check one)
    A. "Experience is the best teacher." ____
    B. Both are important, but classroom training is wasted without the opportunity to test it in the real world. ____
    C. Both are important, but classroom concepts are necessary to prepare the student for the real situation. ____
    D. One hour of good classroom teaching is equal to five hours of on-the-job training. ____

3. The Practicum will give you the best opportunity to apply which one of the following academic subject areas? (check one)
    A. Physical and Life Sciences ____
    B. Social Science and Communication ____
    C. Mathmatics ____

4. The most important opportunity the Practicum will give you is: (rank 1-4)
    A. The opportunity to see academic concepts translated into practical activities. ____
    B. The opportunity to observe and interact with health care practitioners. ____
    C. The opportunity to actually work with the tools and equipment used in health care. ____
    D. The opportunity to actively help a patient. ____

5. The opportunity of finding out that you really won't like a particular health career is, in your opinion: (check one)

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A. A very important aspect of the Practicum ____
B. One aspect of the Practicum ____
C. A minor aspect of the Practicum ____
D. Not an aspect of the Practicum ____

6. You will spend one week in each of five health career settings. Do you think: (check one)
   A. It would be best to spend all 5 weeks in one setting ____
   B. It would be best to spend at least 2 weeks in each setting ____
   C. One week in each setting will be sufficient to get a good general impression of each health career ____

7. In terms of numbers, most health practitioners are: (check one)
   A. Male ____
   B. Female ____
   C. About evenly divided ____

8. In terms of opportunities, the highest paid and longest educated practitioners are in health careers occupied by: (check one)
   A. Males ____
   B. Females ____
   C. About evenly divided ____

During the Practicum you will be working with many adults. For each of the following categories check the one option that best describes your attitudes toward adults.

9. Health Practitioners (rank 1-4)
   A. They probably think most students are lazy or sneaky and are working with us only because they must. ____
   B. They don't really know much about students as people, so you will have to put up a good front most of the time. ____
   C. They are just people and will treat you with the same respect that you treat them. ____
   D. As members of a "helping profession," they will go out of their way to make you feel comfortable and answer your questions ____

10. Patients (rank 1-4)
   A. They will probably have negative feelings about students so you should stay out of their way as much as possible. ____
   B. They don't really understand students so you have to put up a good front most of the time. ____
   C. They are just people and will treat you with the same respect that you treat them. ____
   D. They are seeking medical help and will see you as someone who is there to help and treat you accordingly. ____

11. During the Practicum you will probably come in close contact with practitioners and patients of different social, economic, or ethnic backgrounds than yourself. Of the following statements, rank all 4 with the one that best describes your expectation first and the one that least describes it last:
A. While I am not prejudiced, "they" might be, making my job difficult. ____
B. I have learned to stay out of "their" way and will continue to do so. ____
C. Ethnic differences will probably not effect out relationships at all. ____
D. I am really looking forward to working with people of different backgrounds than myself; I think it will be a valuable learning experience. ____

12. How much time till you probably spend in training for your career: (check one)
A. Go right to work upon completion of high school. ____
B. Spend one year or less in a training program. ____
C. Complete a program at a 2 year community college. ____
D. Complete a four year college program. ____
E. Complete a graduate level university program. ____

13. How sure are you about entering a health career? (check one)
A. Positively ____
B. Probably ____
C. Possibly ____
D. Unsure ____

14. What was your first choice for a health career Practicum placement for this summer?
(Cluster)________________________________
(Occupation)______________________________

15. The main reason for the above choice was: (rank 1-4)
A. My parents, instructors, or friends said I would like it. ____
B. I would have a good chance of getting a job in that field. ____
C. It requires the amount of training that I am willing to undertake. ____
D. I know someone in that occupation and would like to be like them. ____

16. Does one or both of your parents work in a health occupation?
A. Yes ____
B. No ____

17. Have you worked or been a volunteer in a health facility in the past?
    - A. Yes ____
    - B. No ____

18. What is you sex?
    - A. Male ____
    - B. Female ____

19. What is your ethnic group? (check one)
    - A. Mexican American ____
    - B. Asian American ____
    - C. Filipino ____
    - D. Black ____
    - E. Caucasian (or white) ____
    - F. Native American (or American Indian) ____
    - G. Other________________________ ____
      (Identify)

20. What are your parents occupations?
    - A. Mother____
    - B. Father____

21. What was the highest school level attained by either of your parents? (check one)
    - A. Grade school ____
    - B. Some high school ____
    - C. High school graduate ____
    - D. Some college ____
    - E. College graduate ____
    - F. Advanced graduate training ____

Student-1
Posttest

BIOMED PRACTICUM

Student Questionnaire

School: ____________________

Your responses to this questionnaire are confidential. Do not put your name on the questionnaire. Your responses will help us understand the effect of the Biomedical summer program on instructors, health practitioners, and students. There are no right or wrong answers. Check the option that best describes your attitude.

1. In terms of health related knowledge, how well did you find that YOU were prepared for the Practicum experience? (check one)

A. Well prepared _____
B. Moderately prepared _____
C. Slightly prepared _____
D. Not prepared _____

2. The Biomed Practicum combined both classroom training and practical experience. What is your attitude toward these two methods of learning? (check one)

A. "Experience is the best teacher." _____
B. Both are important, but classroom training is wasted without the opportunity to test it in the real world. _____
C. Both are important, but classroom concepts are necessary to prepare the student for the real situation. _____
D. One hour of good classroom teaching is equal to five hours of on-the-job training.

3. The Practicum gave you the best opportunity to apply which one of the following academic subject areas? (check one)

A. Physical and life sciences _____
B. Social science and communication _____
C. Mathematics _____

4. The most important opportunity the Practicum gave you was: (rank 1-4, assigning 1 to most important and 4 to least important)

A. The opportunity to see academic concepts translated into practical activities. _____
B. The opportunity to observe and interact with health care practitioners. _____
C. The opportunity to actually work with the tools and equipment used in health care. _____
D. The opportunity to actively help a patient. _____

5. The opportunity of finding out that you really didn't like a particular health career was, in your opinion: (check one)

A. A very important aspect of the Practicum. ____
B. One aspect of the Practicum. ____
C. A minor aspect of the Practicum. ____
D. Not an aspect of the Practicum. ____

6. You spent one week in each of five health career settings. Do you now think: (check one)

A. It would have been best to spend all 5 weeks in one setting. ____
B. It would have been best to spend at least 2 weeks in each setting. ____
C. One week in each setting was sufficient to get a good general impression of each health career. ____

7. In terms of numbers, most health practitioners are: (check one)

A. Male ____
B. Female ____
C. About evenly divided ____

8. In terms of opportunities, the highest paid and longest educated practitioners are in health careers occupied by: (check one)

A. Males ____
B. Females ____
C. About evenly divided ____

During the Practicum you worked with many adults. The following categories deal with your attitudes toward adults.

9. Health Practitioners (rank 1-4, 1 for most important, 4 for least important):

A. They seemed to think most students were lazy or sneaky and worked with us only because they had to. ____
B. They didn't really know much about students as people, so we had to put up a good front most of the time. ____
C. They were just people and treated us with the same respect that we treated them. ____
D. As members of a "helping profession" they went out of their way to make us feel comfortable and answer our questions. ____

10. Patients (rank 1-4, 1 for most important, 4 for least important):

A. They have negative feelings about students, so we tried to stay out of their way as much as possible. ____

B. They didn't really understand students, so we had to put up a good front most of the time. ____

C. They were just people and treated us with the same respect that we treated them. ____

D. They were seeking medical help and saw us as people there to help; they treated us accordingly. ____

11. During the Practicum you probably came into close contact with practitioners and patients of different social, economic, or ethnic backgrounds than yourself. Rank the following statements 1-4; give a 1 to the statement that best describes your experiences last summer; give a 4 to the statement that least describes them.

A. While I was not prejudiced, "they" were, making my job difficult. ____

B. I learned to stay out of "their" way and will continue to do so. ____

C. Ethnic differences did not affect our relationship at all. ____

D. I enjoyed working with people of different backgrounds than myself; I found it to be a valuable learning experience. ____

12. How much time do you now believe you will probably spend in training for your career: (check one)

A. Go right to work upon completion of high school. ____

B. Spend one year or less in a training program. ____

C. Complete a program at a 2-year community college. ____

D. Complete a 4-year college program. ____

E. Complete a graduate level university program. ____

13. How sure are you about entering a health career? (check one)

A. Positively ____

B. Probably ____

C. Possibly ____

D. Unsure ____

14. What is your first choice for a health career?

(Cluster)____

(Occupation)____

15. The main reason for the above choice is: (rank 1-4)

    A. My parents, instructors, or friends said I would like it. ____
    B. I would have a good chance of getting a job in that field. ____
    C. It requires the amount of training that I am willing to undertake. ____
    D. I know someone in that occupation and would like to be like them. ____

16. Does either of your parents work in a health occupation?

    A. Yes ____
    B. No ____

17. Have you worked or been a volunteer in a health facility? (Do not count the Practicum.)

    A. Yes ____
    B. No ____

18. What is your sex?

    A. Male ____
    B. Female ____

19. What is your ethnic group? (check one)

    A. Latino or chicano ____
    B. Asian American ____
    C. Filipino ____
    D. Black ____
    E. Caucasian (or white) ____
    F. Native American (or American Indian) ____
    G. Other (identify: ____________________) ____

20. What are your parents' occupations?

    A. Mother ____
    F. Father ____

21. What was the highest school level attained by either of your parents? (check one)

    A. Grade school ____
    B. Some high school ____
    C. High school graduate ____
    D. Some college ____
    E. College graduate ____
    F. Advanced graduate training ____

Instructor-1
Pretest

BIOMED PRACTICUM

BIOMED INSTRUCTOR QUESTIONNAIRE

School____

Your responses to this questionnaire are confidential. Do Not put your name on the questionnaire. Your responses will help us understand the effect of the program on teachers, health practitioners, and students.

1. In terms of health related knowledge, how well do YOU think the Biomed students are prepared for the Practicum experience?

   A. Well prepared ____
   B. Moderately prepared ____
   C. Slightly prepared ____
   D. Not prepared ____

2. The Biomed Project combines both classroom training and practical experience. What is your attitude toward these two methods of learning? (check one)

   A. "Experience is the best teacher." ____
   B. Both are important, but classroom training is wasted without the opportunity to test it in the real world. ____
   C. Both are important, but classroom concepts are necessary to prepare the student for the real situation. ____
   D. One hour of good classroom teaching is equal to five hours of on-the-job training. ____

3. The Practicum will give you the best opportunity to apply which one of the following academic subject areas? (check one)

   A. Physical and Life Sciences ____
   B. Social Science and Communication ____
   C. Mathematics ____

4. The most important opportunity the Practicum will give you is: (rank 1-4) ____

   A. The opportunity to see academic concepts translated into practical activities. ____
   B. The opportunity to observe and interact with health care practitioners. ____
   C. The opportunity to actually work with the tools and equipment used in health care. ____
   D. The opportunity to actively help a patient. ____

Field test version 6/18/74

5. The opportunity for students to find out that they do not like a particular health career is, in your opinion: (check one)

   A. A very important aspect of the Practicum ___
   B. One aspect of the Practicum ___
   C. A minor aspect of the Practicum ___
   D. Not an aspect of the Practicum ___

6. Students will spend one week in each of five health career settings. Do you think: (check one)

   A. It would be best to spend all 5 weeks in one setting. ___
   B. It would be best to spend at least 2 weeks in each setting. ___
   C. One week in each setting will be sufficient to get a good general impression of each health career. ___

7. In terms of numbers, most health practitioners are: (check one)

   A. Male ___
   B. Female ___
   C. About evenly divided ___

8. In terms of opportunities, the highest paid and longest educated practitioners are in health careers occupied by: (check one)

   A. Males ___
   B. Females ___
   C. About evenly divided ___

9. If you were participating in the Biomed Practicum as a student what five Practicum placements would you choose:

   First chocie - Cluster ______________________
   Occupation ______________________

   Second choice - Cluster ______________________
   Occupation ______________________

   Third choice - Cluster ______________________
   Occupation ______________________

   Fourth choice - Cluster ______________________
   Occupation ______________________

   Fifth choice - Cluster ______________________
   Occupation ______________________

Instructor-1
Posttest

BIOMED PRACTICUM

BIOMED INSTRUCTOR QUESTIONNAIRE

School ______________________________

Your responses to this questionnaire are confidential. Do not put your name on the questionnaire. Your responses will help us understand the effect of the program on teachers, health practitioners, and students.

1. In terms of health related knowledge, how well did you find the Biomed students were prepared for the Practicum experience?
   - A. Well prepared ____
   - B. Moderately prepared ____
   - C. Slightly prepared ____
   - D. Not prepared ____

2. The Biomed Project combined both classroom training and practical experience. What is your attitude toward these two methods of learning? (check one)
   - A. "Experience is the best teacher." ____
   - B. Both are important, but classroom training is wasted without the opportunity to test it in the real world. ____
   - C. Both are important, but classroom concepts are necessary to prepare the student for the real situation. ____
   - D. One hour of good classroom teaching is equal to five hours of on-the-job training. ____

3. The Practicum gave you the best opportunity to apply which one of the following academic subject areas? (check one)
   - A. Physical and Life Sciences ____
   - B. Social Science and Communication ____
   - C. Mathematics ____

4. The most important opportunity the Practicum gave you was: (rank 1-4, with 1 being highest and 4 lowest)
   - A. The opportunity to see academic concepts translated into practical activities. ____
   - B. The opportunity to observe and interact with health care practitioners. ____
   - C. The opportunity to actually work with the tools and equipment used in health care. ____
   - D. The opportunity to actively help a patient. ____

Field test version 6/18/74

5. The opportunity for students to find out that they do not like a particular health career was, in your opinion: (check one)
   - A. A very important aspect of the Practicum ______
   - B. One aspect of the Practicum ______
   - C. A minor aspect of the Practicum ______
   - D. Not an aspect of the Practicum ______

6. Students spent one week in each of five health career settings. Do you think: (check one)
   - A. It would be best to spend all 5 weeks in one setting. ______
   - B. It would be best to spend at least 2 weeks in each setting. ______
   - C. One week in each setting is sufficient to get a good general impression of each health career. ______

7. In terms of numbers, most health practitioners are: (check one)
   - A. Male ______
   - B. Female ______
   - C. About evenly divided ______

8. In terms of opportunities, the highest paid and longest educated practitioners are in health careers occupied by: (check one)
   - A. Males ______
   - B. Females ______
   - C. About evenly divided ______

9. If you were participating in the Biomed Practicum as a student what five Practicum placements would you choose:

First choice - Cluster ________________________________

Occupation ________________________________

Second choice - Cluster ________________________________

Occupation ________________________________

Third choice - Cluster ________________________________

Occupation ________________________________

Fourth choice - Cluster ________________________________

Occupation ________________________________

Fifth choice - Cluster ________________________________

Occupation ________________________________

Practitioner-1
Pretest

BIOMED PRACTICUM

BIOMED PRACTITIONER QUESTIONNAIRE

Current Occupation ____________________

Your responses to this questionnaire are confidential. Do not put your name on the questionnaire. Your responses will help us understand the effect of the program on teachers, health practitioners and students.

1. In terms of health related knowledge, how well do you think the Biomed students will be prepared for their experiences with you during the Practicum? (check one)
    A. Well prepared ____
    B. Moderately prepared ____
    C. Slightly prepared ____
    D. Not prepared ____

2. The Biomed Project combines both classroom training and experience in the real world of health care and health science. What is your attitude toward these two methods of learning? (check one)
    A. "Experience is the best teacher." ____
    B. Both are important, but classroom training is wasted without the opportunity to test it in the real world. ____
    C. Both are important, but classroom concepts are necessary to prepare the student for the real situation. ____
    D. One hour of good classroom teaching is equal to five hours of one-the-job training. ____

3. The Practicum will give the student the best opportunity to apply which one of the following academic subject areas? (check one)
    A. Physical and Life Sciences ____
    B. Social Science and Communication ____
    C. Mathematics ____

4. The most important opportunity the Practicum will give the student is: (rank from 1 to 5)
    A. The opportunity to see academic concepts translated into practical activities. ____
    B. The opportunity to observe and interact with health care practitioners. ____
    C. The opportunity to actually work with the tools and equipment used in health care. ____
    D. The opportunity to actively help a patient. ____
    E. The opportunity to sample a variety of health careers and to use these experiences as a basis for making decisions about future education, training and work. ____

Field test version
6/20/74

5. The opportunity for a student to find out that he/she did not like a particular health career is, in your opinion: (check one)
   A. A very important aspect of the Practicum ____
   B. One aspect of the Practicum ____
   C. A minor aspect of the Practicum ____
   D. Not an aspect of the Practicum ____

6. The student will spend one week in each of five health career settings. Do you think: (check one)
   A. It would be best to spend all 5 weeks in one setting. ____
   B. It would be best to spend at least 2 weeks in each setting. ____
   C. One week in each setting will be sufficient to get a valid general impression of each health career, i.e. the kinds of work involved. ____

7. In terms of the number of persons employed nationwide in your occupation, most health practitioners are: (check one)
   A. Male ____
   B. Female ____
   C. About evenly divided ____

8. In terms of opportunities for secure employment and promotion to the highest available status within your occupation across the country, most opportunities are available to health practitioners who are: (check one)
   A. Male ____
   B. Female ____
   C. About evenly divided ____

Comments:

Practitioner-1
Posttest

BIOMED PRACTICUM

BIOMED PRACTITIONER QUESTIONNAIRE

Current Occupation ____________________

Your responses to this questionnaire are confidential. Do not put your name on the questionnaire. Your responses will help us understand the effect of the program on teachers, health practitioners and students.

1. In terms of health related knowledge, how well did you find the Biomed students were prepared for their experiences with you during the Practicum? (check one)
   A. Well prepared _____
   B. Moderately prepared _____
   C. Slightly prepared _____
   D. Not prepared _____

2. The Biomed Project combined both classroom training and experience in the real world of health care and health science. What is your attitude toward these two methods of learning? (check one)
   A. "Experience is the best teacher." _____
   B. Both are important, but classroom training is wasted without the opportunity to test it in the real world. _____
   C. Both are important, but classroom concepts are necessary to prepare the student for the real situation. _____
   D. One hour of good classroom teaching is equal to five hours of on-the-job training. _____

3. The Practicum gave the student the best opportunity to apply which one of the following academic subject areas? (check one)
   A. Physical and Life Sciences _____
   B. Social Science and Communication _____
   C. Mathematics _____

4. The most important opportunity the Practicum gave the student was: (rank from 1 to 5)
   A. The opportunity to see academic concepts translated into practical activities. _____
   B. The opportunity to observe and interact with health care practitioners. _____
   C. The opportunity to actually work with the tools and equipment used in health care. _____
   D. The opportunity to actively help a patient.
   E. The opportunity to sample a variety of health careers and to use these experiences as a basis for making decisions about future education, training and work.

Field test version 6/20/74

5. The opportunity for a student to find out that he/she did not like a particular health career was, in your opinion: (check one)
    - A. A very important aspect of the Practicum ______
    - B. One aspect of the Practicum ______
    - C. A minor aspect of the Practicum ______
    - D. Not an aspect of the Practicum ______

6. The student spend one week in each of five health career settings. Do you think: (check one)
    - A. It would be best to spend all 5 weeks in one setting. ______
    - B. It would be best to spend at least 2 weeks in each setting ______
    - C. One week in each setting is sufficient to get a valid general impression of each health career, i.e. the kinds of work involved. ______

7. In terms of the number of persons employed nationwide in your occupation, most health practitioners are: (check one)
    - A. Male ______
    - B. Female ______
    - C. About evenly divided ______

8. In terms of opportunities for secure employment and promotion to the highest available status within your occupation across the country, most opportunities are available to health practitioners who are: (Check one)
    - A. Male ______
    - B. Female ______
    - C. About evenly divided ______

Comments:

Interview-1

BIOMED PRACTICUM

STUDENT INTERVIEW QUESTIONNAIRE

1. Did you enjoy your placements? _____Yes_____No

   Which one(s) were the most enjoyable?_______________________________________

   ____

   Why? (Probe)

   Which one(s) were the least enjoyable?______________________________________

   ____

   What made them not enjoyable?

   How could this site (these sites) be improved for next year?

2. Did the high school curriculum you've already studied help to prepare you for any (all) of your placements? _____Yes_____No Give examples:

3. Where are you now in your career planning?__________________________________

   ____

   How, if at all, were your career plans affected by the Practicum? (Look for changes; strengthening of confidence in choice; tendencies toward selection, etc.)

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What is it that attracts you to that career (those careers)? (Probe for criteria--including emotional--upon which decisions were made.)

4. Have you noticed any changes in yourself over the 7 weeks of the Practicum? (Probe for: treated like adult, more dependable, more independent, self-directed, aggressive, responsible, better able to express myself verbally, more self-confidence.)

5. Did you use the module for your placements? (Show examples.) _____Yes_____No _____Somewhat. What was the most helpful part of the modules?

The least helpful?

How could the modules be improved in the future?

6. Let's talk for a few minutes about the way the Practicum was run, the schedule, and so on.
   a. What did you think of the Orientation?

   What should be covered in the Orientation next year?

   How long should the Orientation last?

b. How do you feel about the length of the Practicum? _____Just right _____Too long _____Too short.
How long should it be next year?____

c. What about the meetings? Did they seem useful? _____Yes_____No _____Sometimes. Please explain.

What kinds of meetings should we have next year?

How often?

d. Help us evaluate the role of the Practicum staff (teachers, paraprofessionals, curriculum developers). Did you get enough help and guidance from staff?_____Yes_____No_____Sometimes. Please explain:

How could their role be changed in the future?

e. Would you be willing to go 9 weeks to a Practicum, one week for Orientation and 2 weeks at each of 4 job sites?

7. What is the most important thing you learned during the Practicum?

APPENDIX C

HEALTH CAREER INFORMATION SOURCES: A BIBLIOGRAPHY*

The following bibliography is intended as a guide to the literature including references to essays on health career opportunities and job descriptions, encyclopedias of vocational information, and directories. It is by no means a comprehensive list, but rather is designed to highlight some excellent and frequently consulted sources of information.

The bibliography is divided into four main sections.

I. General Career Information (which includes sections germane to the health sciences)

II. General Information on Health Careers

III. Medicine and Dentistry

IV. Allied Health Occupations

I. GENERAL CAREER INFORMATION

Bay Area employer directory. Compiled and published by James R. Albin. Sausalito, California, December 1973.

Career education, what it is and how to do it, by Kenneth B. Hoyt (and others) Salt Lake City, Olympus Pub. Co., 1972

Career planning handbook; a guide to career fields and opportunities, GS-1/11. U.S. Civil Service Commission (Washington), 1971.

College placement annual--1975. College Placement Council, Inc. Bethlehem. Penn., 1974. (Warren E. Kauffman, editor)

A college student's guide to career planning; what college students need to know about career planning and jobs, by Frank S. Endicott. (Chicago) Rand McNally (1967).

Director of college placement offices. Bethlehem.

Education and vocational guidance today (by) Trefor D. Vaughan, London, Routledge and K. Paul, 1970.

Encyclopedia of careers and vocational guidance. William Hopke, editor-in-chief. Garden City, New York, Doubleday (1967) 2 vols.

(1972 edition is available in Education/Psychology Library. Vol. I: Planning your career; vol. II: Careers and occupations.)

Graduate and professional school opportunities for minority students. Educational Testing Service. 4th ed., 1972-73. Princeton, New Jersey (1972)

(the 5th edition, 1973-74, is located at 400 Eshleman. Section on medical and allied health professions gives information on where to write and schools or institutions which have particular interest in recruiting minority students.)

*Source: Health Science Information Service, University of California, Berkeley, January 9, 1975.

Innovations in the use of career information (by) Joyce M. Chick. Boston, Houghton Mifflin (1970)

Making vocational choices: a theory of careers (by) John L. Holland. Englewood Cliffs, N.J., Prentice-Hall (1973)

Manpower. v. 1- 1969-

Modern vocational trends handbook. Ed. 4-7, 1957/58-1970. New York.

Occupational guide. California. State Department of Employment. no. 1- Sept. 1956-

Occupational information and guidance. (By) Daniel Sinick, Boston, Houghton Mifflin (1970)

Occupational literature; an annotated bibliography (prepared by) Gertrude Forrester. 1971 ed. New York, Wilson, 1971

(1958 edition is available in Main Library, Social Welfare and Education/ Psychology Libraries)

Occupational outlook handbook; employment information on major occupations for use in guidance. U.S. Bureau of Labor Statistics. Ed. 1- 1949-

(Also available at UGL under following call no.: HF5381 A1 036)

Occupational programs in California public community colleges, 1973-74. Prepared by Leo A. Meyer for the California Community Colleges. Rev. June 1973.

The occupational thesaurus by Everett A. Teal, Lehigh University, Bethlehem, Penn., 1971. 2 vols.

(Vol. 1: a job guide handbook for majors in: anthropology, economics, history, languages, mathematics, political science, psychology and sociology; vol. 2: job guide handbook for majors in: accounting, biology, chemistry, finance, geology, management, marketing, physics, and transportation)

The professions and their prospects. Eliot Freidson, editor. Beverly Hills (California) Sage publications (c1973)

II. GENERAL INFORMATION ON HEALTH CAREERS

The AHA guide to the health care field (prepared by) American Hospital Association. 1972- Chicago.

Careers and opportunities in the medical sciences (by) Arthur S. Freese. New York, E.P. Dulton and Co., 1971.

Careers in health fields--state of California. (Prepared by) Mrs. Jay B. Hann III, Chairman of Health Careers Booklet, Printed by: Woman's Auxiliary to the Alameda Contra Costa Medical Association. Alameda County Unit, District I. Rev. 1973.

Directory of health careers (prepared by) Hospital Council of Southern California. Looseleaf binder.

(Four parts: occupations, sources of training, aptitudes and interests, and HCSC member hospitals.)

A guide to the health professions. Prepared by Laura B. Weiss and Ann B. Spence. Harvard University, Boston, 1973.

Health careers guidebook (by) U.S. Department of Labor, manpower Administration (and) U.S. Department of Health, Education, and Welfare, National Institutes of Health. 3d ed. (Washington, U.S. Department of Labor) 1972.

(Provides information on the opportunities and working conditions in the health fields)

Horizons unlimited (prepared by) American Medical Association. 8th ed. Chicago, Illinois, 1970.

Minorities and the health professions: an annotated bibliography. Melody A. Smith, editor, Association of American Medical Colleges, 1972.

Quick reference chart of health careers in California. Produced by California Medical Association and Women's Auxiliary to the CMA.

III. MEDICINE AND DENTISTRY

Admission requirements of American Medical Colleges, including Canada. Published by Association of American Medical Colleges. 1951-

Admission requirements of U.S. and Canadian dental schools: 1974-75. Published by the American Association of Dental Schools in cooperation with the Council on Dental Education, American Dental Association. Washington, D.C., 1973.

Association of American Medical Colleges curriculum directory. 1955, 1968/69-

Directory of approved internships and residencies. (Chicago)

Guide to foreign medical schools (by) Daniel Marien (3d ed.) New York; Queens College Press/Institute of International Education (1973)

The need for graduates of California medical schools (by) Grover J. Daly and Charles A. Pillsbury. California Department of Finance, Program Review Branch; September 1973. Report no. PR74.

Scientific directory and annual bibliography. U.S. National Institutes of Health, 1969-1970.

Women in medicine (by) Carol Lopate. Baltimore, published for the Josiah Macy, Jr., Foundation by the Johns Hopkins Press (1968)

World directory of medical schools. World Health Organization. 1st- 1953-

Allied health education programs in junior colleges. 1970 - (Bethesda, Md?)

Allied health education programs in senior colleges. 1971- Washington.

Allied medical education directory. 1972- Chicago, Council on Medical Education, American Medical Association.

(Source of information on allied medical education)

Bridging the medical care gap--the physician's assistant: GS-7 through GS-11. U.S. Civil Service Commission. Bureau of Recruiting and Examining. Announcement no. 428. Issued March 1971.

A career in orthoptics. Washington, D.C. American Orthoptic Council

(A brochure explaining orthoptics: the work, qualifications, prospects and earnings, training and costs; includes a list of Preceptorships in Orthoptics accredited by the American Orthoptic Council)

Colleagues or competitors? A study of the role of five of the professions supplementary to medicine (by) Margaret Martin. London, Bell (1969)

The current scene in social work education (by) Arnulf M. Pins (and others) New York, Council on Social Work education (1971)

A directory of training programs for physician support personnel--1973-74. Prepared jointly by American Medical Association, Division of Medical Practice, Department of Health Manpower and U.S. Department of Health, Education, and Welfare, Health Resources Administration; Bureau of Health Resources Development, Division of Manpower Intelligence. (1974?) U.S. DHEW publication no. (HRA) 74-318.

"Engineering in medicine: a melding of the professions" (by) Edward Fox. *Engineer*, Jan/Feb 1970, vol. XI, no. 1, pp. 12-18.

Essentials for hospital volunteer service; a guide. New York, United Hospital Fund of New York (1968)

Establishing a new career: the social health technician (by Anita S. Vogel. Washington) U.S. Dept. of Labor, Manpower Administration, 1971.

Health care functions and responsibilities of physician's assistants: a survey. (By) American Medical Association, Department of Health Manpower, Division of Medical Practice (1973?)

Hospitals. Guide issue. 1949-

(Listings of health care institutions, American Hospital Association membership, health organizations, agencies, educational programs and hospital statistics)

Index of opportunity in the nursing profession. 1971. Resource Publications, Inc., Princeton, New Jersey, 1971.

(A directory of career opportunities for registered nurses with hospitals, nursing homes, sanitariums, and other medical, health and welfare institutions)

Job descriptions and organizational analysis for hospitals and related health services. U.S. Training and Employment Service. Prepared in cooperation with the American Hospital Association. Rev. ed. (Washington, U.S. Government Printing Office) 1970.

Medical laboratory careers with a future. Chicago, Illinois, Registry of Medical Technologists.

(Brief descriptions of and required training for: medical technologists, medical laboratory technicians, certified laboratory assistants, cytotechnologists, histologic technicians, pathologists)

Medical technology--the career with a future. UCSF School of Medical Technology, approved by the Council on Medical Education of the American Medial Association, San Francisco, California.

Mental health directory of state and national agencies administering public mental health and related programs. 1964- Bethesda, Md., U.S. National Institute of Mental Health.

(Information on mental health resources in the U.S.)

"Paramedics: new doctors' helpers." Time, Nov. 9, 1970. p. 38.

(A short article about paramedics--mentions physician's assistant training programs at Duke University, pediatric nurse practitioner training at University of Colorado and training for family health workers at Watts Health Center in Los Angeles and at the Bronx's Montefiore Hospital)

Pharmacy school admission requirements, actual 1973-74, projected 1974-75, prepared by Office of Student Affairs, American Association of Colleges of Pharmacy. 1st ed. 1973.

Review of training programs and utilization of paraprofessionals in medicine and dentistry. Revised and updated by Bridget Tighe. Washington, Institute for the Study of Health and Society. 1972.

Role differentials in rehabilitation counseling and social work serving disabled people; conference proceedings. W. Alfred McCauley, executive director; Lewis W. Carr, director. Washington, National Rehabilitation Association, 1971.

Selected training programs for physician support personnel. (Prepared by Genrose Copley and Karen Lechter. Bethesda, Md.) National Institutes of Health, Professional Requirements Branch, 1971. U.S. DHEW publication no. (NIH) 72-183.

Summary of training programs: physician support personnel. Prepared jointly by American Medical Association, Division of Medical Practice, Dept. of Health Manpower and U.S. Dept. of Health, Education, and Welfare, National Institutes of Health, Bureau of Health Manpower Education, Division of Manpower Intelligence. June 1972. U.S. DHEW publication no. (NIH) 73-318.

(U.S. DHEW publication no. (NIH) 73-318, Sept. 1972 is also available in T-5)

Your future as a dietitian, by members of the American Dietetic Association. (1st ed.) N[ew] Y[ork] R. Rosen Press (1964) 1975 ed. by Betty Travis.

Your future in food technology (by) George E. Brissey. (1st ed.) New York, R. Rosen Press (1966, c1967)

(1975 edition will be available soon)

Your future in optometry (by) James R. Gregg. (Rev. ed.) New York, Arco (1971)

Your future in social work (by) Bertram M. Beck (1st ed.) New York, R. Rosen Press (1963, c 1964)

APPENDIX D

ADDITIONAL FORMS

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1. Hospital Assignment Sheet. 116
2. Student Resume 117
3. What to Expect from Your Doctor. . . .118
4. Bill of Rights for Patients. 119
5. Supplementary Activities for Student Orientation. 120

Office of Occupational Preparation

SAN FRANCISCO UNIFIED SCHOOL DISTRICT -135 Van Ness Ave., San Francisco, Calif. 94102

HOSPITAL ASSIGNMENT SHEET

STUDENT NAME ______________________________

ADDRESS ______________________________

TELEPHONE NO. ______________________________

HOME SCHOOL ______________________________

HOSPITAL ______________________________

DEPARTMENT ASSIGNMENT ______________________

DAYS M T W TH F

HOURS ______________________

When students are at the hospital, a coordinator from the school district will be present to supervise students. The coordinator for your hospital is ________________________________ and may be contacted at Extension ____________________.

SAN FRANCISCO UNIFIED SCHOOL DISTRICT

ALLIED MEDICAL PROGRAM--BIOMEDICAL PRACTICUM 1974*

STUDENT RESUME

Name ______________________________ Age __________
Last First

High School ______________________________ Date of Birth ________

Home Address ______________________________
Street City Zip

Home Phone ____________ In case of problems or emergency, call Ms. Mandy Frank at the Office of Occupational Preparation, SFUSD, 863-4680, extension 243, or

____
Name Relationship Daytime phone

Major health career interests:

Why I am interested in these particular careers:

Relatives or friends employed in, or preparing for health-related occupations: (Name of occupation)

Subjects that interest me most in school:

Subjects that interest me least in school:

Hobbies:

Plans for the summer after the end of summer school:

Previous work experience or Allied Health Program experience:

Current employment (if any) ______________________________
Job Employer Hours

Present thoughts about what I will do after finishing high school:

What I hope to learn from participating in the Biomed Practicum this summer:

Additional comments:

*If you need to contact a Biomed instructor during non-school hours, please call Sandra Shure, Instructor in Biomed Social Sciences 665-1852, or Gary Shimamoto, Instructor in Biomed Science 387-8395.

WHAT TO EXPECT FROM YOUR DOCTOR

1. An accurate diagnosis of your condition, healthy or otherwise, at your request.
2. Results and meaning of any tests and examinations performed by him or by others at his direction, as soon as they are available.
3. Indications for treatment, varieties and alternatives, pros and cons of particular treatments in the opinion of other experts, as well as the doctor's own preference and the reasons for it.
4. Answers to your questions about any examination or procedure he may perform, in advance of or at any time during the performance of it. Stopping any examination or procedure at any moment, at your request.
5. Complete information about purpose, content and known effects of all drugs prescribed or administered, including possible risks, side effects and contraindications, expecially of any combination of drugs.
6. Willingness to accept and wait for a second medical opinion before performing any elective surgery which involves alteration or removal of any organ or body part.
7. Answers to your questions about your body or your general physical health and functioning, in addition to any particular condition, or encouragement to seek these answers from another source

Source: Our Bodies, Our Selves, N.Y., N.Y.: Simon and Schuster, 1971

BILL OF RIGHTS FOR PATIENTS

A bill of rights for hospital patients - including the right to reject treatment and choose death - was proclaimed today by the American Hospital Association.

The Association decreed that a patient shall not be transferred to another hospital until he has understood the reasons and that the second hospital must agree to accept the patient before a transfer is made.

Cook County (Chicago) Hospital has charged that private hospitals are "dumping" sick patients on the county without notification and consent.

The patient also has a right, the document said:

. To considerate and respectful care.

. To examine and receive an explanation of his bill, regardless of the source of payment.

. To obtain from his physician complete information about his diagnosis, treatment and prognosis in terms he can understand.

. To receive the information necessary to give informed consent before a treatment is started.

. To refuse treatment to the extent permitted by law and to be informed of the medical consequences of his action.

. To privacy concerning his own medical care program.

. To expect that all communications and records of his case be confidential.

. To obtain information on the relationship of his hospital to other institutions caring for him.

. To be told if the hospital is going to use him in any experiment in connection with his treatment.

. To expect reasonable continuity of care.

. To examine and understand his bill.

. To know the hospital rules that apply to him as a patient.

The bill of rights was prepared by the AHA's committee on health care for the disadvantaged. The committee consists of administrators, physicians, and four consumers.

The document, drafted after a long study by the association's board of trustees and four consumer representatives, appeared likely to result in some confrontations between hospital administrators and doctors.

Source: S.F. Examiner
1/5/73

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BIOMEDICAL PRACTICUM

SUPPLEMENTARY ACTIVITIES FOR STUDENT ORIENTATION

The following activities are designed to introduce practicum students to some important aspects of health care which they can observe in their own neighborhoods. These activities should help them to more quickly perceive and understand the kinds of work which they will be observing in their practicum placements, and should also assist them to place their practicum experiences in a broader social context.

Phone books, other directories (e.g. in San Francisco The People's Yellow Pages) and the individual health care practitioners with whom the students' families have contacts, can be helpful to students in identifying the locations of health care programs and facilities. Practicum instructors can discuss these activities with the entire group, provide additional suggestions from their own experiences with health care programs and practitioners, and then ask students to prepare their own program of activities for the time allotted.

Suggested Activities.

1. Spend a half-day or day at a rest home. Then visit a day care center or kindergarten. Do you see similarities and differences in the way the clients (children and old people) are treated by the staff? What conclusions can you draw about health-care practitioners' views of children and the aged?

2. Assess the health care facilities in your neighborhood. Classify the facilities according to categories you define (possibilities are: private practice--one physician; rest home/convalescent home; free clinic; etc.). Find out what kinds of patients/clients come to each place, what services each facility offers, how far people have to travel to visit the facility, what special problems (if any) each facility specializes in, whether different ethnic groups have different types of services, etc.

3. Visit some large health-care facilities in your area. In San Francisco, some possibilities are:

   a. Lighthouse for the Blind
   b. The Red Cross
   c. The Salvation Army (especially Yerba Buena free meals, etc.)
   d. Flyshacker Program for the Handicapped
   e. Alcoholics Anonymous
   f. Smokers' groups
   g. psychiatric help agencies, such as Fort Help
   h. Synanon and other drug-rehabilitation programs
   i. Haight-Ashbury Free Clinic
   j. Planned Parenthood

and many others. The "California Living" section of the San Francisco Chronical Examiner had a series of articles a few months ago which identified health care programs and services in the city. They should be on file at your local library. Ask the librarian for assistance in locating them.

4. Students should learn that death is an every-day phenomenon in health care. It would be interesting to visit the coroner's office and the morgue. This will be a lead-in to morgue preparation which takes place in most hospitals. If possible, arrange to have the students meet as a group with the Chief Medical Officer of the San Francisco Coroner's office. He talked recently about SIDS (sudden infant death syndrome), a fascinating research endeavor recently underway, and one which has been needed since ancient times.

Field test version: 6/17/74

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5. Several health care practitioners have recommended a book call *The Well-Body Book*, which is a health-care manual written for the layman. It tells you how to do your own physical examination, which would be a good half-day's activity for a lab. In addition, the book is good reading, because it lays it on the line about what good health is and how to get it.

6. A visit to a mental-health facility would be interesting, provided it could be done in small-enough groups so that the facility is not blown wide open by 60 kids dropping in. Those facilities connected with jails and prisons would be interesting. You might also see if you could find out what kinds of health services are available to persons in mental-health facilities as well as in jails.

7. By interviewing health-care facilities and residents of your neighborhoods, try to come up with a class list of the barriers to health care. Here are some examples; see if you can discover others:

age
minority status
language difficulty
poor education
conflicting religious beliefs
conflicting cultural backgrounds and ideas
low self-control (illustrated by obesity, alcoholism, drug addiction)
poor insurance
Medicare, MediCal's philosophy of cure rather than care of maintenance.

8. Have a group discussion about the Bill of Rights of the Patient (attached). Frequently, patients put themselves in a subservient position when they are with their doctor; they don't challenge what he does and simply accept everything he says. Many health care practitioners believe that patients *should* be aware of and *should* demand their rights. See the attached sheet for a listing of some of those rights. Can you think of others?

9. Along the same line is the selection "What to Expect from your Doctor." Ask students and teachers to compare notes from their own experiences; it might be interesting to interview parents before this discussion to get more information from adults who have most likely had greater experience with health care services. Perhaps you can find a physician to join in with the discussion. Dr. David Sanchez with the Urban Health Care Program at San Francisco General Hospital could probably recommend one.

10. John O'Connor, Coordinator of Allied Health Professions Programs for the San Francisco Unified School District, has on his staff this summer a paraprofessional who might be willing to meet with students for a discussion on what to expect at the facilities which are accepting students for Practicum placements. This man spent several years as a student in the Allied Health summer program and is reported to be *au courant* of what high school students can expect. Call him at John O'Connor's office at San Francisco General Hospital. 648-8200, extension 268, and if you have the opportunity to talk with him, find out also what a paraprofessional is and does.

11. If you want to know what to expect in a dentist's office, call Sandy Riddiough. (From the name, you will probably suspect that she's a woman. What position in dentistry would you expect her to occupy? Why?) Sandy has offered to speak, but would need several days' advance warning; her work number is 567-1532; home is 388-2763.

12. With lots of luck, it *might* be possible to get another very busy person to come and talk with Practicum students about medical social work. Her name is Julie Ball; she works at Presbyterian Hospital and is very provocative, knows her stuff, and can get a discussion going quickly. Her number at Presbyterian is 563-4321. Ask for her extension, and if she is not available there, have her paged.

APPENDIX E

SAMPLE STUDENT JOURNAL

Today was perhaps the most interesting day at the hematology department. I visited the bleeding room where direct patient contact is exposed. I was also taught how to operate the automatic and manual fibrometers, the centrifuge and the micro-centrifuge, and was shown how the calculator (in the stat room) works... very different from the pocket calculators sold at Macy's.

At the bleeding room, I observed how blood was obtained from the patients. First, a piece of porous cloth dampened with alcohol is rubbed on the patient's. vein (located at the upper arm area...found by tapping the area)....

When using a purple-capped test type shake it well because there are 2.5 mg of substance that prevents any clotting of blood in the glass tube.

Procedure for manual fibrometer

After having a test tube of blood separated (by use of a centrifuge) into serum and red blood cells, carefully remove the serum from the test tube. Place it in another test tube. Using the automatic pipet, insert the serum into a disposable cup. Then add (by use of the automatic pipet) 1 ml of fibrolet in the disposable cup. After incubating the serum (at 37°) for at least two minutes, carefully shake the cup and place it in the cup holder under the probe. Insert 1 ml of CaCl (by use of automatic pipet). When inserting the CaCl, make sure the switch on the automatic pipet is in the "on" position. As soon as you insert the CaCl, the meter starts ticking. At the appropriate time the meter will display the time (in seconds) at which it takes the blood to clot.

Procedure for automatic fibrometer

After having two test tubes (for each patient) of blood separated (by use of a centrifuge) into serum and rbc, carefully remove the serum from each of the test tubes. Place each into another test tube. Place both test tubes at the appropriate test tube slot. Press "start" and there you have it....

The time (in seconds) will be recorded on a piece of paper located at the top right side of the apparatus. Make sure you adjust the knob (located below the red light) to the appropriate test.

The two fibrometers operate on different factors. The manual uses the fibrogen and CaCl. The automatic uses either fibrogen, prothrombin conversion (from prothrombin to thrombin) factor, Stuart factor--Stuart-Prower factor, or proacclerin labile factor; depending on the type of test desired. I noticed three types of test that involved the use of the fibrometers; the Partial Thromboplastin Time Test (PTT), the Activated Partial Thromboplastin Time Test (PTT) and the One Stage Prothrombin Time Test (PT).

Additional Comments--definition and source

Partial Thromboplastin Time Test(PTT)--It is nothing more than a simple clotting time with one less variable. Platelet variability is controlled with a phospholipid reagent providing maximum activity. The test measures those plasma factors involved in the generation of plasma thromboplastin. Platelet function and the conversion factor (from prothrombin to thrombin) are not measured.

Thromboplastin--a source which aids in the formation of thrombin and thus promotes the normal blood clotting mechanism.

Thrombin--a chemical (enzyme) which becomes active when blood leaves its natural place within the blood vessel system. Thrombin induces blood clotting. Lack of it may lead to fatal hemorrhage.

Phosphorus--a normal constituent in human blood.

Source: Activated Thromboplastin Time (APTT)--the variable of plasma contact may be controlled by exposing the plasma to a specified amount of an activator for a standard amount of time. The contact will shorten the number of seconds required for normal plasma to clot and narrow the limits of the normal range.

One Stage Prothrombin Time Test (PT)--an extrinsic source of thromboplastin and calcium is added to the test system and the one stage prothrombin time test is performed. The test measures those coagulation factors involved in the extrinsic clotting system namely the fibrogen, prothrombin, conversion, Stuart--Stuart-Prower, and proaccelerin-labile factors.

The micro-centrifuge has a maximum speed of 11,000 rpm's.

The hematocrit test is a test on blood to determine the relative proportions of blood cells to plasma. In anemia the proportion of plasma to red cells is increased. It is usually measured in %. My hematocrit percentage is 43%... 32%-48% is the normal rage.

The stat room is where pririty cases are tested. In other words, lab cases are normally done at appropriate laboratories, but stat (from latin work "statum" meaning emergency) patients must have their lab data immediately, therefore the stat room was created. In the bleeding room, a stat patient has priority over other patients, therefore the blood technician handles that patient first.

* * *

July 19

I saw the removal of an abcess from a German Shepherd's thigh early in the morning. Abcesses, dentistries, neuterings, and animals with Foxtails are the commonest cases that come in. On the average, there is either at least one spay or castration a day. Dogs and cats usually come in; rabbits, birds, mice, turtles, hamsters, and guinea pigs rarely come in for any treatment. Snakes are referred to another hospital where they can be treated.

The Marina Pet Hospital is considered a small animal practice, as most (all?) of San Francisco's Pet Hospitals and clinics are. By definition, small animal practice is limited to treatment of house pets, a large animal practice deals more with "farm-type" animals: horses, cows, livestock, chickens, etc.

Dentistries are done by a veterinary assistant with a surgical mask on to protect one from the bacteria removed from the teeth. The veterinary assistant also wears a pair of surgical gloves to protect her hands from the bacteria. Dogs and cats should have their teeth cleaned about once a year depending upon the condition of the teeth.

I was called to hold down a very wild-acting cat who was to be anesthetized in preparation to be spayed. Like human patients, there are patients who take shots and take examinations without any complications. Then, there are patients who create all sorts of problems for the doctor while being given medication. This cat was one of the latter. But the anesthetic was successfully given despite the scratches received.

It's an advantage to the veterinary student to have work experience at a veterinary station during their college year studying veterinary medicine, since it gives the student first hand experience in a veterinary office and a taste of the field.

Home care of patients wearing splints or cast

1. Examine the splint or cast soon after the animal is home so that any changes in position, shape and color would be evident.

2. Keep the splint or cast dry at all times.

3. Talcum powder or corn starch helps to protect the animal from sores (friction sores) that may occur where the soft metal ring or a splint rubs in the groin or in the armpit of the animal.

4. Activity of the animal wearing the splint or cast should be held to a minimum.

5. Patient should never be allowed to run free or unsupervised.

Return the animal to the hospital when:

1. Any change in position of the splint or cast on the limb.

2. Any excessive chewing of the cast or splint by the animal.

3. Any signs of excessive discomfort.

4. Any unusual or bad odors coming from the splint or cast.

5. Any unexplained soiling of the splint or cast by blood or discharges.

6. Any pronounced sores that develop at the top of a cast or under the upper ring of a splint.

7. If there is any suggestion of trouble with the splint or cast, it is always better to have the animal examined rather than wait for the next scheduled appointment.

APPENDIX F

SAMPLE OF PRACTITIONER'S SUGGESTED ACTIVITIES FOR STUDENTS

This sample was prepared by a medical technologist. She used a summary of the first draft of the Biomedical Curriculum as a reference and the lesson numbers refer to that version.

OCCUPATION Clinical lab Technicial COMPLETED BY Alma Evans DATE 6-18-74

UNIT "Nutrition (stomach/liver) TOPIC Physiology and Pathology

Lesson Number	Typical activities students can observe*	Typical activities students can perform*	Math skills used in those activities	Suggested references
	← 2-3 hours →	← 1 hour →		
40 series	Observe histo/pathological specimen preparation--ideally stomach or liver." Examine normal section on slide. Examine infected section on slide--ideally tissue invaded by parasite. Examine parasite (similar ones) in a different medium (e.g. feces). Note difference between larvae and adult worm.	Carry through a tissue section staining process. Set up microscope.		?Author. "Clinical Parasitology." Hepler's, Lab Methods.

*Please estimate length of time you believe should ideally be spent on each activity

OCCUPATION Clinical Lab Technician

COMPLETED BY Alma Evans

DATE 6-18-74

UNIT Nutrition (Liver)

TOPIC Physiology and Pathology

Lesson Number	Typical activities students can observe*	Typical activities students can perform*	Math skills used in those activities	Suggested references
	← 2 hours →	← 1-2 hours →		
40 series (con't)	Liver lecture or review on function of metabol. Can relate to dysfunction to common use of street drugs. (toxicological effects)			Sunshine: Toxicology (? too advanced for direct student use).
	--Bilirubin	--Test for "Jaundice" Bile pigment studies		Davidsohn and Wells: "Clinical Lab Diagnosis"

*Please estimate length of time you believe should ideally be spent on each activity

OCCUPATION Clinical Lab Techincian COMPLETED BY Alma Evans DATE 6-18-74

UNIT Chemistry TOPIC Spectrophotometry

Lesson Number	Typical activities students can observe*	Typical activities students can perform*	Math skills used in those activities	Suggested references
	← 2 hours →	← 1-2 hours	→	
10	Colorimetry--relationship between concentration and optical density (and percent transmittance of light). 1. Observe measurement of an analysis--preferably a quick hand method whereby the (a) student can observe technique of setting up a hand procedure (b) watching the development of color; indicating concentration of substances and (c) final measurement in an electrical device.	Simple spectral curve on varying concentrations of a colored solution 1. Prepare $cuSO_4$ solution*, plot concentration vs. optical density on graph paper. 2. Note relationship between concentration and O.D./% Transmission 3. Standardization: explore basis for measuring unknown (i.e., patients) solution of (?) concentration against a standard concentration.	Theory of Beers Law Calculation--calculation for determining an unknown sample against a standard sample.	Davidsohn and Wells: "Clinical Lab Methods"

*The preparation of solution(s) could be an extra exercise if desired. Or prepared solutions could be on hand for students. This would include pipeting: Introductory approach. Pipeting with standard chemical solutions before handling patient material.

*Please estimate length of time you believe should ideally be spent on each activity

OCCUPATION Clinical Lab Technician COMPLETED BY Alma Evans DATE 6-18-74

UNIT Chemistry and Nutrition TOPIC Carbohydrates and Protein

Lesson Number	Typical activities students can observe*	Typical activities students can perform*	Math skills used in those activities	Suggested references
	← 2 hours →	← 2 hours →		
	Lecture or review of importance of carbohydrates and proteins (blood levels and urine) levels in:	1. Set up a simple determination for sugar using Stds. Also, protein (total) could be determined.		Davidsohn and Wells--Op. Cit. Film (Urinalysis) Lilly or Squibb
	a. Carbohydrate metabolism Normal pattern Hyperglycemic Hypoglycemic b. Protein metabolism Normal pattern hyper globulenemia hypoalbuminemia	(If lab hesitant to have students handle patient material a known standard-chemical could be used as a student unknown.)	*Using Beer's Law Calculation, determine the concentration of unknown sample from the known standard sample.	Discuss relationship of urine values to blood; also demonstrate the flow of blood (carrying dissolved substances) through nephron.*
	*Lecture is basic and common to many health professionals while activities performed are more specific to the lab setting.			*Student would benefit most if background has included some minimal physiology re. circulation.

*Please estimate length of time you believe should ideally be spent on each activity

OCCUPATION ____________ COMPLETED BY Alma Evans DATE 6-18-74

UNIT Respiration TOPIC Pathology Bacteriology

Lesson Number	Typical activities students can observe*	Typical activities students can perform*	Math skills used in those activities	Suggested references
7 34 44	Effects of various factors on breathing and respiratory function. a. Observe various kinds of patients on respiratory therapy. 1. Cigarette smokers 2. Diabetics (coma) 3. Congestion due to bacterial related disease.* This might be a perfect opportunity for the student to spend with another member of health team: nurse who might take student around or respiratory therapist or health educator if available. Someone not directly involved with lab. 2 hours combined	1. Observe histo/path specimen on slide--1hour. 2. Diabetic acidosis relate substance which make body pH acid. 3. Prepare a culture: a. Streaking plates (at least) b. After 24° incubation prepare slide for microscopy from suspicious bacterial growth and sensitivity plating. 2-3 hours		1. A.V. aid in pulmonary function. 30 minutes 2. A.V. aids available may simplify concept. 30 minutes 3. Davidsohn and Wells, Clinical Laboratory Diagnosis

*Please estimate length of time you believe should ideally be spent on each activity

APPENDIX G

SALARY CHART*

Range 1:

dental asst.
dental lab technician
food service supervisor
licensed practical (vocational) nurse
certified laboratory assistant
electroencephalograph technologist
physical, occupational therapy aide
admitting clerk
orderly
ward clerk

Range 2:

computer operator
physical, occupational therapy assistant
cytotechnologist
diagnostic X-ray technician
ultrasound technician
histologic technician
inhalation therapist
medical assistant
executive housekeeper
dental hygienist
sanitarian
emergency medical technician (ambulance)

Range 3:

nuclear medical technologist
medical technologist
medical librarian
food and drug inspector and analyst
dietician
professional (registered) nurse
recreational therapist
vocational rehabilitation counselor
physical therapist
occupational therapist
administrative assistant
computer programmer
dietitian
medical records administrator
medical social worker
psychologist (Master's degree)
safety engineer
speech pathologist and audiologist
paramedic
orthopedic technician

Range 4:

biochemist (bachelor's)
hospital administrator
pharmacist
psychologist (Ph.D.)
biochemist (master's)
biochemist (Ph.D.)
sociologist
many supervisory positions

Range 5:

podiatrist
optometrist
osteopathic physician
dentist
physician

*Salaries are not quoted here because they change rapidly and they vary a great deal. But Range 1 is low, Range 3 is average, and Range 5 is high.

APPENDIX H

BIOMED PRACTICUM

HEALTH CAREER CLUSTERS

The following arrangement of health occupations by type of service or work performed is intended to provide the student or layman with a means to more readily grasp the nature and variety of health career opportunities, the many functions which together compose the health care delivery system. It cannot and should not be considered as a fixed or rigid arrangement. (There is no systematic grouping of health occupations which is common throughout the professional health community.) Several occupations are appropriate to one or more clusters, and are so identified.

1. Basic Sciences and Engineering
2. Community Health Services
   Mental Health Services
   Social Services
   Health Education and Communication Services
   Environmental Health Services
3. Dental Services
4. Diagnostic and Laboratory Services
5. Dietetic and Nutritional Services
6. Health Institutional and Health Services Management
7. Medical Appliance Technology
8. Medical Services
9. Nursing Services
10. Pharmaceutical Services
11. Rehabilitation and Therapeutic Services
12. Vision, Speech and Hearing Services

BASIC SCIENCES AND ENGINEERING

Associate Degree and Other Prebaccalaureate

Medical Electronics Technician

Primarily Baccalaureate (some with post-baccalaureate clinical training)

Biomedical Engineer Technician (see also Medical Appliance Technology)
Genetic Assistant

Primarily Post-Baccalaureate

Anatomist
Bacteriologist
Biochemist
Biomathematician
Biomedical Engineer (see also Medical Appliance Technology)
Biophysicist
Clinical Chemist (see also Diagnostic and Laboratory Services)
Endocrinologist
Entomologist
Epidemiologist
Geneticist
Hematologist (see also Medical and Related Services)
Microbiologist
Parasitologist
Pharmacologist
Physiologist
Public Health Biologist
Public Health Chemist
Public Health Microbiologist
Serologist
Spectroscopist
Virologist

COMMUNITY HEALTH SERVICES: MENTAL HEALTH

1 Year or Less Beyond High School

Community Mental Health Worker
Psychiatric Aide
Psychiatric Technician

Primarily Post-Baccalaureate

Mental Health Educator
Psychiatric Social Worker
Psychiatrist (see also Medical Services)
Psychologist: Clinical Psychologist, School Psychologist, Counseling Psychologist, Social Psychologist
Psychometrist

COMMUNITY HEALTH SERVICES: SOCIAL SERVICES

1 Year or Less Beyond High School

Home Health Aide
Homemaker
Social Work Aide

Associate Degree and Other Prebaccalaureate

Public Health Assistant
Social Work Assistant

Primarily Post-Baccalaureate

Medical Social Worker: Case Work, Group Work, Community Organization and Planning
Public Health Social Worker

COMMUNITY HEALTH SERVICES: HEALTH EDUCATION AND COMMUNICATION

Associate Degree and Other Prebaccalaureate

Computer Programmer

Primarily Post-Baccalaureate

Biostatistician
Health Educator
Medical Economist
Medical Sociologist
Public Health Statistician
Social Research Analyst
Medical Education Director (see also Health Institutional Management)
Training Director (see also Health Institutional Management)

Primarily Baccalaureate (some with post-baccalaureate clinical training)

Computer--Applied Science Programmer, Technical Programmer
Health Information Specialist
Medical Illustrator
Medical Photographer
Science Writer
Statistical Clerk
Technical Writer
Medical Record Administrator (see also Health Institutional Management)

COMMUNITY HEALTH SERVICES: ENVIRONMENTAL HEALTH

1 Year or Less Beyond High School

Environmental Aide
Sanitary Technician

Associate Degree and Other Prebaccalaureate

Environmental Technician (Environmental Health Technician)

Primarily Baccalaureate (some with post-baccalaureate clinical training)

Radiation Protection Specialist
Food and Drug Analyst
Food and Drug Inspector (see also Pharmaceutical and Related Services)

Primarily Post-Baccalaureate

Allergy Environmentalist
Environmental Health Engineer
Environmental Health Scientist (Ecologist)
Food Technologist (see also Pharmaceutical)
Health Physicist
Industrial Hygienist (Indust. Hygiene Engr.)
Public Health Sanitarian
Public Health Toxicologist
Radiologic Health Technologist: Radiobiologist Radiologic Engr., Radiologic Physicist
Sanitarian
Sanitary Engineer

DENTAL SERVICES

Associate Degree and Other Prebaccalaureate

Dental Assistant
Dental Hygienist
Dental Laboratory Technician
Dental X-Ray Technician

Primarily Post-Baccalaureate

Dentist: Oral Pathologist
  Oral Surgeon
  Orthodontist
  Pedodontist
  Periodontist
  Prosthodontist
  Public Health Dentist

DIAGNOSTIC AND LABORATORY SERVICES

1 Year or Less Beyond High School

Certified Laboratory Assistant
Histologic Technician
Medical Laboratory Aide

Associate Degree and Other Prebaccalaureate

Laboratory Technician (Medical Laboratory Technician)

Baccalaureate and Prebaccalaureate

Certified Laboratory Technician
Cytotechnologist

Primarily Baccalaureate (some with post-baccalaureate clinical training)

Chemistry Technologist
Medical Technologist
Microbiologist

Primarily Post-Baccalaureate

Bioanalyst
Blood Bank Technologist
Clinical Chemist (see also Basic Sciences and Engineering)
Medical Technologist Specialist in Chemistry
Medical Technologist Specialist in Hematology
Medical Tech. Specialist in Microbiology
Nuclear Medical Technologist
Pathologist (see also Medical Services)

DIETETIC AND NUTRITIONAL SERVICES

1 Year or Less Beyond High School

Dietary Aide
Diet Clerk
Dietetic Worker

Associate Degree and Other Prebaccalaureate

Dietetic Assistant (Food Service Supervisor)
Dietitian Technician (Nutrition Care Services

Primarily Baccalaureate (some with post-baccalaureate clinical training)

Administrative Dietitian
Chief Dietitian
Clinical (Therapeutic) Dietitian
Dietary Consultant
Dietetic Intern
Dietitian
Hospital Food Service Administrator (see also Health Institution Management)

Primarily Post-Baccalaureate

Nutritionist
Public Health Nutritionist
Research Dietitian
Research Nutritionist
Teaching Dietitian

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HEALTH INSTITUTIONAL AND HEALTH SERVICES MANAGEMENT*

1 Year or Less Beyond High School

Medical Office Assistant
Medical Receptionist
Pre-Admissions Counselor
Safety Officer

Associate Degree and Other Prebaccalaureate

Medical Record Technician

Primarily Baccalaureate (some with post-baccalaureate clinical training)

Admitting Officer (Admitting Supervisor)
Controller (Business Manager)
Executive Housekeeper
Hospital Engineer
Hospital Food Service Administrator
Medical Record Administrator (Medical Record Librarian)
    (see also Health Education and Communication Services)
Public Relations Director
Purchasing Agent
Health Program Advisor
Volunteer Director

Primarily Post-Baccalaureate

Clinic Director
Hospital Administrator
Information Systems Director
Medical Care Administrator
Medical Education Director (see also Health Education and Communication Services)
Nursing Home Administrator
Personnel Director
Public Health Administrator
Purchasing Director
Training Director (see also Health Education and Communications Services)

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*Institutional management, clerical and maintenance positions which generally parallel those found in business and industry and require no specialized knowledge or training in health care are not included in this listing.

MEDICAL APPLIANCE TECHNOLOGY AND RELATED SERVICES

1 Year or Less Beyond High School

Cardiovascular Technician
Dialysis Assistant
Electroencephalograph (EEG) Technician
Intravenous Technician
Orthotics Technician
Prosthetics Technician
Respiratory (Inhalation) Therapy Technician

Associate Degree and Other Prebaccalaureate

Computer Operator in Health Data
Electrocardiograph (EKG/EEG) Technician
Hyperbaric Chamber Technician
Medical Electronics Technician
Nuclear Medicine Technician
Pulmonary Function Technician
Radiologic Technologist (X-Ray Technician)
Renal Dialysis Technician
Respiratory (Inhalation) Therapist
Extracorporeal Circulation Specialist
Health Testing Technician

Baccalaureate and Prebaccalaureate

Biomedical Engineering Technician (see also Basic Sciences and Engineering)
Orthotist
Prosthetist
Radiation Therapy Technician
Health Physics Technician

Primarily Baccalaureate (some with post-baccalaureate clinical training)

Radiation Therapy Technician

Primarily Post-Baccalaureate

Biomedical Engineer (see also Basic Sciences and Engineering)
Radiation Therapy Technologist

MEDICAL AND RELATED SERVICES

1 Year or Less Beyond High School

Animal Keeper
Animal Technician
Medical Emergency and Ambulance Technician (Emergency Medical Technician)
Medical Secretary
Veterinary Hospital Attendant

Associate Degree and Other Prebaccalaureate

Laboratory Animal Technician (Veterinarian Technician)
Medical Assistant
Medical Assistant in Pediatrics (Pediatric Assistant)
Physician's Assistant: Assistant to the Primary Care Physician
Orthopedic Physician's Assistant
Urologic Physician's Assistant
Podiatric Assistant

Primarily Baccalaureate (some with post-baccalaureate clinical training)

Animal Scientist
Child Health Associate

Primarily Post-Baccalaureate

Osteopathic Physician
Podiatrist
Physician:
- Anesthesiologist
- Cardiologist
- Dermatologist
- Flight Surgeon
- General Practitioner
- Gynecologist
- Intern
- Internist
- Medical Officer
- Neurologist
- Neurosurgeon
- Obstetrician
- Ophthalmologist
- Orthopedic Surgeon
- Otolaryngologist
- Pathologist
- Pediatrician
- Physiatrist
- Plastic Surgeon
- Police Surgeon
- Plastic Surgeon
- Police Surgeon
- Proctologist
- Psychiatrist
- Radiologist
- Urologist
- Thoracic Surgeon
- Family Practitioner
- Colon and Rectal Surgeon
- Specialist in Preventive Medicine

Veterinarian:
- Anatomist
- Bacteriologist
- Epidermologist
- Laboratory Animal Care
- Livestock Inspector
- Meat Inspector
- Parasitologist
- Pathologist
- Pharmacologist
- Physiologist
- Public Health
- Virologist
- Virus-Serum Inspector

NURSING RELATED SERVICES

1 Year or Less Beyond High School

- Nurse's Aide: general
  - Obstetric Aide
  - Pediatric Aide
  - Surgical Aide
  - Psychiatric Aide
- Nursing Assistant
- Operating Room Assistant
- Orderly
- Practical Nurse
- Surgical Technician

Associate Degree and Other Prebaccalaureate

- Licensed Practical Nurse (LPN)
- Licensed Vocational Nurse (LVN)
- Psychiatric Technician
- Urology Technician

Baccalaureate and Prebaccalaureate

- Registered Nurse (RN):
  - Clinical--Coronary Care
    - Intensive Care
    - Midwife
    - Pediatric
    - Psychiatric
  - Community--Industrial
    - Public Health
    - School Nurse

Primarily Baccalaureate (some with post-baccalaureate clinical training)

- Nurse Anesthetist

Primarily Post-Baccalaureate

- Head Nurse
- Nurse, Instructor
- Nurse Practitioner
- Nurse Supervisor

PHARMACEUTICAL AND RELATED SERVICES

Associate Degree and Other Prebaccalaureate

Hospital Pharmacy Technician
Pharmacy Assistant

Primarily Baccalaureate (some with post-baccalaureate clinical training)

Food and Drug Analyst (see also Environmental Health Services)
Food and Drug Inspector (see also Environmental Health Services)
Food Technologist (see also Environmental Health Services)
Pharmacist: Community, Hospital, Technology and Quality Control
Pharmaceutical Chemist

Primarily Post-Baccalaureate

Pharmacology Specialist

VISION, SPEECH AND HEARING SERVICES

1 Year or Less Beyond High School

Optician Apprentice

Associate Degree and Other Prebaccalaureate

Dispensing Optician
Optical Technician
Optometric Assistant
Orthoptic Technician

Baccalaureate and Prebaccalaureate

Orthoptist

Primarily Post-Baccalaureate

Audiologist
Optometrist
Speech Pathologist
Speech Therapist

REHABILITATION AND THERAPEUTIC SERVICES

1 Year or Less Beyond High School

Occupational Therapy Aide
Physical Therapy Aide
Vocational Rehabilitation Aide

Associate Degree and Other Prebaccalaureate

Occupational Therapy Assistant
Physical Therapy Assistant

Baccalaureate and Prebaccalaureate

Corrective Therapist
Educational Therapist
Home Economist in Rehabilitation
Manual Arts Therapist
Music Therapist
Occupational Therapist
Physical Therapist
Reading Therapist
Recreational Therapist
Vocational Rehabilitation Counselor

APPENDIX I

Press Release

If you work in or happen to visit a hospital, medical laboratory, dentist or doctor's office, pharmacy or other health care facility and see some high school students walking around taking notes, don't be surprised. Students from two high schools in the Mt. Diablo Unified School District have recently begun an unusual assignment. Sixty students, half from College Park High School and half from Mt. Diablo High School are phoning and visiting as many health care and health science facilities in Contra Costa County as they can locate. These phone calls and visits are designed to produce a "Guide to Health Science Resources." The Guide will be made available for use throughout the School District.

The inventory is part of the social studies component of the Biomedical Interdisciplinary Curriculum Project. The project combines bio-math, bio-science and social science in a two-year program for high school juniors and seniors which will prepare and motivate students to enter and complete the various higher education programs leading to careers in the medical and health fields.

Funded by the National Science Foundation, the Bio-med Project is broadly interdisciplinary in nature, each discipline drawing upon and supporting the others whenever possible. Within the science course, basic concepts in biology, chemistry and physics are presented in the context of medical and health problems. The mathematics portion of the curriculum parallels the content of the science course.

In the social science course, the idea is stressed that health and medical problems are human problems and depend for their solution on an understanding of the individual in his social context. The student considers the individual in a truly ecological sense: as part of a multiplicity of environmental systems, all of which interact to affect health. Curriculum materials stress the application of concepts in all three courses.

This summer students from these two high schools will be assigned on a rotating basis, to various health care facilities throughout Contra Costa County. Two teachers, Weyland Sheppard, science teacher from Mt. Diablo High School and R. V. Johnson, social science teacher from College Park High School, will be coordinating the activities of the students. The summer practicum, associated with the Mt. Diablo Unified School District Summer School, will provide students with an opportunity to integrate their classroom experience of this past year in math, science and social studies, with a practical application gained in health science facilities and institutions in the community.

A special Inventory Committee has been formed to assist students in their task of surveying community health facilities. Temporary co-chairmen are R. V. Johnson and Roy Fowler, social science teachers at College Park and Mt. Diablo High Schools. Community members include Lee Armstrong, Virginia Hall, Margaret Myhrer, Susan Olsen, Jan Schlosser, Lester M. Schwab, D.V.M., and Mary Walters. Dr. Richard Merrill of the Mt. Diablo Unified School District is Chairman of the Project's Community Advisory Board. Ms. Terry Alt with the Biomedical Project is providing staff assistance.

Further information about the inventory, the Biomedical Project and the summer practicum can be obtained by contacting Mrs. Virginia Hall (685-3675) or Mrs. Susan Olsen (254-6025)

Photographs of Biomedical students at work are available and can be obtained from Dr. Richard Merrill (682-8000, Ext. 349).

APPENDIX J

informant ________
follow-up? ________
assigned to ________
completed by ________

PRACTICUM SITE DEVELOPMENT: INFORMATION ABOUT SITE SUITABILITY

Cluster ________
Occupation ________

Name of facility: ________________

Name of facility administrator: ________________

Number of weeks site is available: ________

Dates site is available: ________

Number of students per week which site could accomodate: ________

Name of site practitioner: ________________

Position: ________________ Phone: ________

Hours of operation: ________

Heaviest work hours: ________

Hours not possible for placement: ________

Hours best suited for placement: ________

Previous experience with high school students: Yes _____ No _____

If yes, name of program: ________________

Duration of student placement: ________________

Appropriate dress: ________________

"Atmosphere" Warm _____ Correct _____ Confused _____

Has information about Practicum been received?

By facility administrator?
By site practitioner?

Orientation: To assist students to be prepared for this placement
Availability of brochure:
filmstrip:
speaker (rap session):
other:

Confidentiality: Program publicity (name of contact) ________________

Appropriateness of videotape: ________________

____

Other: ________________

Conference Space Availability (number of persons which should be accomodated)

____

Any additional information which would be useful for teachers: ________________

____